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ABSTRACT

Intended for use by those who teach or work with youth in classroom or organizational settings, this self-contained module is designed to teach novices how to prepare for and conduct a safe backpack trip. Initial chapters present background information under nine headings: introduction (objectives, backpack history, information about Missouri forests and trails), backpacking ethics, equipment (clothing, gear), cooking (food, stoves), navigation (planning, methods, emergency procedures), campsite (selection, organization, clean up), preparation (planning, packing, conditioning), important considerations (weather, injuries, plants, wildlife, emergencies), and where to go (map sources). The unit then offers 11 lesson plans for conducting at least 15 50-minute class sessions. For each lesson, the unit details teaching method, duration, purpose, required materials and facilities, and an outline. The lessons cover the subjects in the nine background chapters of the unit as well as an actual backpack trip and a course review and evaluation. Additionally, the unit contains a glossary, a bibliography, names and addresses of backpack specialists and consultants in Missouri, and student handouts including a puzzle; checklists for selecting a campsite, packing, and conditioning; and practical and written tests. (SB)

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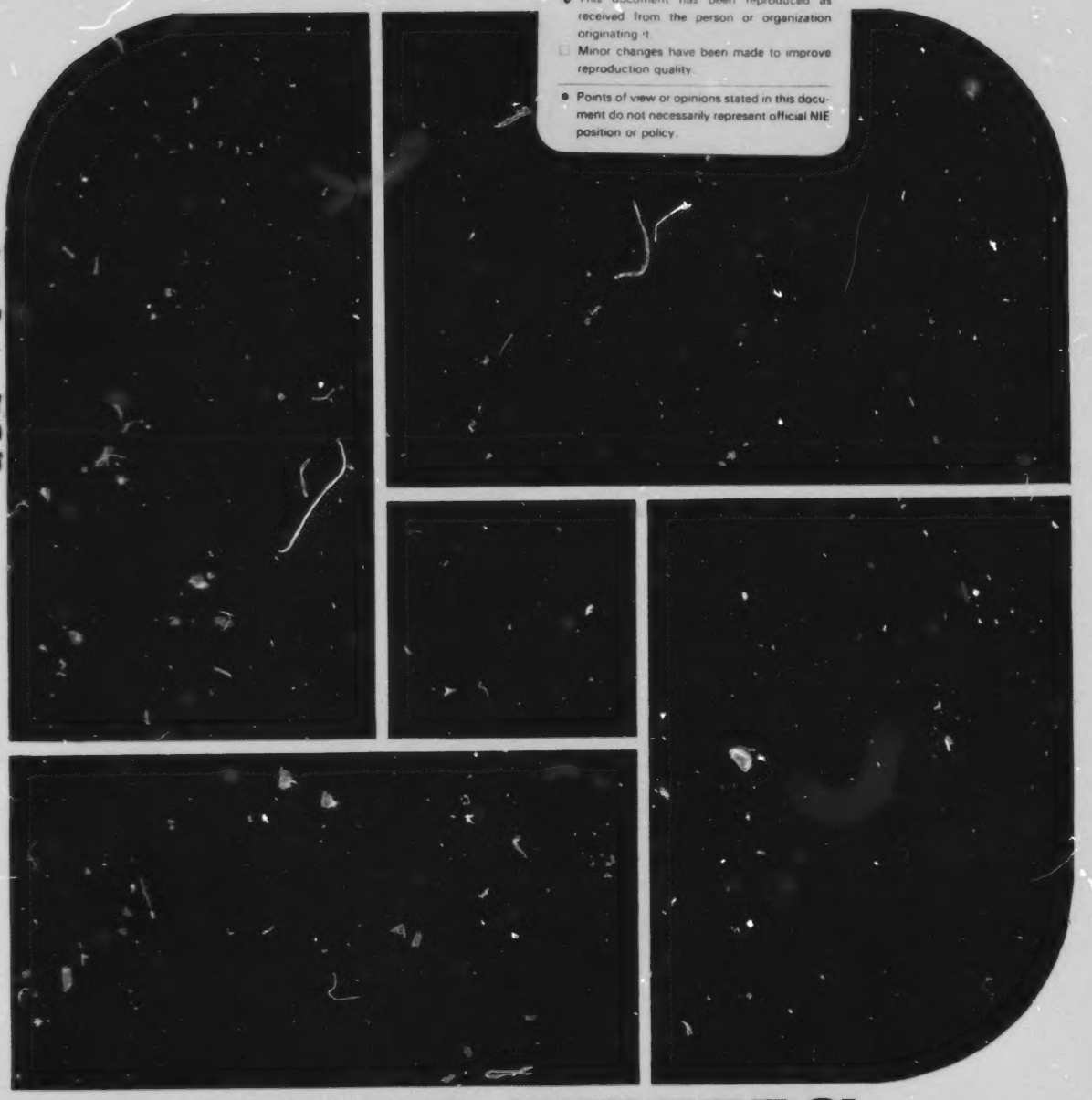

BACKPACKING

OUTDOOR LIVING SKILLS SERIES

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A PROGRAM OF THE MISSOURI DEPARTMENT OF CONSERVATION

OUTDOOR SKILLS EDUCATION MODULES

Missouri's natural resources belong to all its citizens. More and more people are going outdoors to hunt, fish, boat, hike, camp, explore, and learn about nature. The skills they use in the outdoors can have a direct effect on resources. That's why it is important to educate youth and adults in how to use the outdoors wisely and responsibly through schools, community groups, and agencies.

The Outdoor Skills Education Unit of the Department of Conservation, in cooperation with the Department of Elementary and Secondary Education, is developing educational programs to teach Missourians how to use wisely and skillfully the state's many resources for outdoor recreation. The materials, presented as modules, can be used individually or combined in a series by schools, camps, clubs, scouting groups, and other youth or adult organizations. Topics include the shooting sports, casting and angling, trapping, archery, backpacking, camping, aquatics, map and compass, and other skill areas.

Each module is a self-contained unit that includes information on the subject, lesson plans, activities, class exercises, tests, suggested visual aids, and references. Experienced instructors who have taught the subjects and successfully used the activities have written the modules.

For additional information on conservation and outdoor education programs, write the Education Section, Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102.

INSTRUCTOR MANUAL

BACKPACKING

OUTDOOR LIVING SKILLS SERIES

MISSOURI DEPARTMENT OF CONSERVATION
EDUCATION SECTION

JUL 1984
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About the author

Jim Mentis has been a public education teacher in Missouri for 33 years. He is presently Associate Professor in Recreation/Leisure Studies at Southwest Missouri State University. He is involved in outdoor programs for the university, as well as youth-serving agencies in the community. He also has worked with public agencies in recreation and served on boards and committees. He has served as a consultant to school districts as well as municipalities in organizing and developing outdoor programs.

Jim received a bachelor of science degree from Southwest Missouri State University and a master of science degree from Arkansas University. Hiking, backpacking, and camping are among his leisure and recreational pursuits.

How to use this module

This module has been produced for you who teach or work with youth. The material has been written with the classroom teacher in mind, but it also can be adapted by leaders of camps, 4-H clubs, scouting organizations, and other youth groups. A variety of information and activities has been included to make the module useful to as many groups as possible. It may be used individually or combined with other modules for a more extensive course.

The *Backpacking* module contains:

Introductory Information—Questions such as "Why teach this subject?" are answered. Goals and objectives approved by the Missouri Department of Elementary and Secondary Education are established.

Ethics—The importance of acting responsibly in this and all outdoor activities is stressed.

Historical Background—A brief history is included.

Equipment—Detailed information is given on how to select boots, clothing, backpacks, sleeping bags, and tents.

Cooking—Included is information on the types of food available and how to plan, package, and prepare meals. Information on backpacking stoves and the fuels they burn also is included.

Navigation—This subject is covered only briefly since instructors are encouraged to use the *Map and Compass* module to teach navigation.

Campsite—Selection of a campsite is particularly important from an ethical standpoint, so information is included on how to select a site, what to do about sanitation and water, and how to clean up the area.

Preparation—How to plan a trip, what to take, how to pack, and how to get into shape are covered.

Important considerations—Included here are weather, injuries and illnesses, wildlife and plants on the trail, and how to avoid emergencies.

Where to go—Information is included on where to go and how to obtain maps for an area.

Lesson Plans—Field-tested methods of teaching this material are provided in 11 lesson plans. The time for each

lesson is only suggested and will vary with instructors. Equipment and materials needed for the activities are listed.

Student Handouts—Information sheets for student use are included in the appendix. These handouts are keyed to individual lessons and may be reproduced for students.

Glossary and Bibliography—These are provided as additional information which may help in teaching the subject in more detail.

Suggested Exam—If you want to evaluate your students mastery of the material, a sample exam is included. Test questions are keyed directly to the objectives for the modules.

Outdoor skills education specialists are assigned to eight regions throughout the state. They will assist you in obtaining materials and scheduling equipment and films that are available from the Department of Conservation. Conservation education consultants are assigned to 14 regions and will discuss with you the Department's conservation education materials. Check the last page of this module for names, addresses, and regions.

Review committee

The material in this module has been reviewed by the education section administration, outdoor skills education specialists, and a review committee comprised of the following people:

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Topic Outline

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I. Goal of Module
II. Purpose
III. Content
IV. A Warning Note
V. Objectives
VI. Brief History
VII. Reasons for Backpacking
VIII. Missouri Forests and Trails

Ethics

Responsibilities when backpacking and camping

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   D. Lacing
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- A. Types
- B. Nutrition
- C. Eating habits
- D. Planning and packaging
- E. Preparation
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Introduction

Goal of the module

To enable individuals or groups interested in backpacking and hiking to explore these activities in a prepared, safe, and responsible manner.

Purpose of the module

Novice backpackers, upon completion of a class based on this module, should be able to take to the trail in an organized manner, with their house on their back. They should be able to care for basic necessities, fulfill leisure and recreational needs, and safely return to home base without having marred the areas they visited.

People going backpacking can have a safe and rewarding experience if it is well-planned and everyone is properly prepared. This module should be used to teach individuals and groups how to prepare for and conduct a safe backpacking trip.

Other modules in the Outdoor Living Skills Series (*Basic Principles, Backpack Cookery, Campground Cookery,* and *Map and Compass*) and the S.P.O.R.T. Ethics class materials supplement information in this module. They should be used to teach a comprehensive course.

Content

Information on ethics, trip planning, equipment selection, campsite selections, packing, safety, travel routes, and environmental considerations is included. The appendix contains material that can be used as resource aids and handouts for students. To enhance the course, you may also want to use films, filmstrips, examples of equipment, speakers, and demonstrations.

A warning note

The responsibility of leading a backpacking outing should never be taken lightly. It can be a potentially dangerous situation if you are not prepared and have not planned your trip adequately. Weather is usually your most unpredictable factor, and you should know how to prepare for variable conditions.

Teacher training workshops, offered by the Department of Conservation and other state agencies, will at times offer backpacking courses. Several private organizations offer training and certification. In Missouri, contact STREAM, 470 E. Lockwood, Webster Groves, MO 63119, 314/968-9203.

Out-of-state groups include Outward Bound, Inc., 384 Field Point Rd., Greenwich, CT 06830, 203/661-0797 or 1-800-243-8520; the National Outdoor Leadership School, P.O. Box AA, Lander, WY 82520, 307/332-6973; and Wilderness Education Association, Route 1, Box 3400, Driggs, ID 83422, 208/354-8384 or 307/353-9914; to name only three. Some universities and colleges also offer courses. If possible, talk to someone who has attended a program

you are considering before you invest time and money.

Your own experience on the trail will help, but you also need experience planning a trip for a group. Do not attempt to do it alone until you are comfortable with the responsibility.

Note to instructor: See the chapter on "Outdoor Leadership" in Paul Petzoldt's The Wilderness Handbook *(listed in bibliography).*

Objectives

Upon completion of the module, the student should be able to do the following:

1. Describe how people through history have relied on traveling by foot and carrying their necessities for life.
2. List five reasons why people backpack.
3. Describe a program of conditioning.
4. Describe how to select a campsite, giving at least five considerations influencing selection.
5. Discuss the technique for assuring a proper fit with boots.
6. Describe at least three things you can do to keep your feet warm.
7. Explain why it's best to wear layers of clothes in cold weather.
8. List the advantages of wool.
9. Name and describe two sleeping bag designs. Discuss the advantages of each.
10. List five factors you should consider when selecting a tent.
11. Pitch and strike a two-person tent.
12. Demonstrate how to pack a backpack by showing proper assembly of gear and equipment, weight distribution, and putting on and taking off the pack.
13. Demonstrate how to light a backpack stove, then boil a cup of water.
14. Describe proper procedure for the following:
    a. How to dispose of garbage
    b. How to build a fire
    c. How to dig a latrine
    d. How to clean up a campsite
15. List five things you can do to help avoid an emergency on the trail.
16. Predict some of the problems you might have if you went backpacking with boots and a backpack that didn't fit properly.
17. Write a short paragraph describing how your plans for a backpacking trip would be affected if there were no public lands for backpacking and camping.
18. Make a list of problems created by a lack of outdoor ethics and propose at least one solution for each.

Brief history

Historically, walking is extremely important. Some anthropologists even link man's learning to walk with other significant developments, such as the pairing of thumb and forefinger which has allowed us superior manipulation of tools. Man's evolution as a walker probably was tied to his

Carrying supplies on the back used to be a necessity rather than a leisure time activity.

need to gather food.

A study of the history of civilization indicates early man spent his day pursuing food, eating, hiding to avoid predators, and sleeping. As he hunted his food, he carried with him the means for survival—thus, he became the first backpacker.

As man learned more, he tamed the wilderness and localized his food supply. On foot he hunted or fished an area, continuing to carry his supplies.

When he became more agrarian, he added farming to hunting and fishing as a source of food. Domestic animals provided transportation at this time and pack animals were used to carry supplies and equipment. But not everyone could afford an animal, so many people still moved on foot from place to place, carrying supplies and wares necessary for existence.

In the early history of Missouri, records indicate Indians, trappers, hunters, fishermen, surveyors, and even settlers relied on their feet and legs to move them over trails and areas inaccessible to animals and wagons. If we today still enjoy walking, hiking, or backpacking, perhaps we have inherited this characteristic from our forefathers.

Reasons for backpacking

We walk in an average human lifetime 115,000 miles—or 5 times around the Earth.

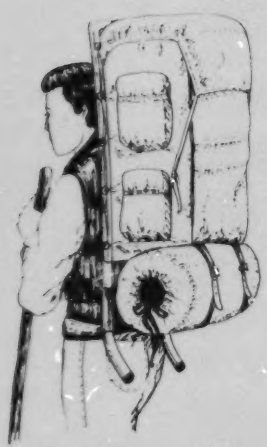
Thousands of backpackers take to trails in this country. In recent years, these numbers have increased. Predictions are they will continue to increase.

Our heritage, however, is steeped in outdoor experiences, skills, and lore—from the Pilgrims to the traders and trappers who explored the West. Many Americans have been returning to the outdoors to experience satisfying forms of recreation in a natural environment. Our need for outdoor experiences still persists and backpacking is one form of outdoor recreation.

The outdoors has been, and always will be, a laboratory for learning as well as a playground for having fun. It affords people a special kind of fulfillment not available in any other setting.

Why do people backpack? Many become involved because their friends do it, others because they hear people talk about it. Some become interested from classes, agencies, or organizations that promote hiking and backpacking.

Most seek the fun and enjoyment of being on the trail, while vigorous exercise and becoming physically fit reward others. Peace of mind, serenity, and mediation fulfill some. A difficult challenge is met head-on and overcome by a few. Still others want to learn new skills and gain further knowledge. Groups enjoy new friendships and improve communication through interactions. There are those who appreciate a misty sunrise, a glimpse of wildlife drinking at a pond, or a breathtaking timberline view. Others want to find out about themselves in the midst of an environment so proportionately large.



The outdoors is both a laboratory and a playground.

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Those interested in hunting, fishing, spelunking, rappelling, drawing, carving, and photography, to name a few, use backpacking to help them pursue their sport or hobby. Some hunters have found that by backpacking they do not miss the best part of the day for hunting—between low sun and dusk—when they normally would be heading back to camp. With their camp on their backs, they can stay out, seek new territory, and be prepared for any change in weather.

Missouri forests and trails

Missouri abounds with hiking opportunities—some 2.8 million acres of public recreation lands, owned and administered by the U.S. Forest Service, U.S. Army Corps of Engineers, National Park Service, Department of Conservation, and the Department of Natural Resources. Each agency provides hiking trails for the public. One trail—the Ozark Trail—is unique. It is a joint team effort of all the agencies, plus some private owners. When completed, the trail will meander 300 miles through the heart of Missouri's vacationland.

Hiking trails, especially those administered by the U.S. Forest Service and the Department of Conservation, sometimes pass through forests that are managed in a systematic fashion to provide a source of perpetual wood fiber for the consumer industry and improved habitat for more native wildlife. These forests also keep pollutants and eroding soils from entering the streams and lakes.

Foresters are well aware of the recreational opportunities that forests offer. They try to manage areas in ways that do not detract from hikers' enjoyment of a pristine environment. As a result of their efforts, hikers should see a healthier forest that provides more habitat for more animals, thus increasing chances to see wildlife.

Ethics

Always practice good outdoor manners.

Backpackers need to develop a philosophy, an understanding, an appreciation of the outdoors. Knowledge of the outdoors and how to use our natural resources, hopefully, will result in good outdoor manners and responsible behavior.

The ecological system as we know it now will not survive if we do not maintain a balance between people and nature. Our responsibility is to be stewards of the land and see that it is managed and maintained for future generations to enjoy.

Trail manners

Trail manners dictate that backpackers develop consideration for fellow packers as well as the environment. Following a few simple guidelines will help avoid problems, especially in congested areas.

A descending packer should be allowed to pass first if met on the trail by a group ascending. Those who are slower should step aside and allow others to pass.

Fences are in place to contain areas and animals, so be careful not to damage them if you need to cross. Leave gates as you found them—open or closed. Signs are on the trail for informative purposes—leave them there.

With trails becoming more crowded and solitude more difficult to find, it is imperative that backpackers make the least impact possible on the environment. For example, selecting a campsite is important so the natural characteristics of an area are not damaged (see section on campsite selection).

Waste

Human waste will naturally deteriorate with time, but it should be disposed of so it will not be a health hazard. (See section on campsite sanitation and water supply, page 40.)

Trash

Garbage will spoil, attract wildlife, and contaminate a site. Cans, paper, foil, tabs, and plastics need to be placed with garbage in bags and packed out. Land agencies issuing permits will dictate burning regulations.

Pack out what you pack in!

Washing

Whether washing dishes, clothes, or yourself, you should be away from any water source. Use non-detergent and biodegradable soap. Dump the water off the trail. (For more information, see section on campsite cleanup, page 41.)

Noise

Surveys indicate that backpackers choose solitude as one of the most popular reasons for going into the wilderness. Making loud noises and playing radios have no place on the

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trail or at the campsite. Soft singing and instrument playing, however, are tolerable to many people.

Flora and fauna

Do not pick flowers or cut live trees. Do not blaze a tree; if you must mark a trail, use cloth or paper. Avoid disturbing animals, especially during nesting or reproduction periods. Do not leave behind garbage. Follow the prescribed regulations for any public area you use.

Erosion

Cutting cross-country or taking short cuts may create erosion problems. Stay on prepared trails. If a trail or camping site has been heavily impacted and use is limited, abide by the regulations so nature can restore the site.

Campsites

Limit the size of your group to about 10 people and have them spread out, rather than converge in one spot, when selecting campsites. *Do not* trench tents, build unauthorized fires or leave fire scars, carve on trees, or deface property in any way. *Do* leave an area in as good or better a condition as you found it. Remember—you are responsible for what you do and use in the outdoors.

How long will it last if you leave it behind?

Orange peels—3 months
Paper containers—5 months
Old wool socks—1 to 5 years
Milk cartons—5 years
Plastic bags and polyurethane—20 years
Plastic film—20 to 30 years
Nylon fabrics—30 to 40 years
Leather shoes—50 years
Plastic bottles—50 to 80 years
Aluminum cans—80 to 100 years or even longer if submerged in water

(Times vary depending on conditions.)

Equipment

Note to instructor: Much money can be spent on equipment; however, it is not always necessary. In many cases you can improvise or borrow equipment.

Do not be hasty when choosing equipment. Talk to experienced backpackers and ask their recommendations. Your equipment should be lightweight, low in bulk, and durable. Look for quality, even if you have to spend a little more.

Boots

Boots are classified by how they are used. Lightweight hiking boots will be adequate for most backpacking in Missouri.

When carrying a weighted pack, a great deal of stress is placed on the backpacker's feet. Your boots are probably your single most important piece of equipment. Good boots and a proper fit cannot be emphasized too strongly. While experienced packers may own more than one pair of boots, a beginner should concentrate on selecting a single pair that will be stiff enough to protect the feet, yet not weigh one ounce more than necessary. Many people buy more boot than they need.

Boots are generally classified by their type of use and may be referred to as trail, hiking, climbing, or mountaineering boots. A hiking boot will be adequate for the average backpacker. It can be used on trails that are in good condition or that are rough and rocky. Lightweight boots are suitable for much of the terrain in Missouri.

PROPER FIT

Try not to order boots. You should examine and wear a number of boots before making a purchase. Your normal shoe size is your first rough guide to fit. Wear the socks you plan to wear when hiking. Shop in the afternoon so your foot has had a chance to expand to normal walking size. To avoid blisters and an achilles tendon bruise, make sure you have adequate room for your foot against the rear of the boot. Flex your toes and force your foot forward—you should be able to insert a forefinger between your heel and the rear of the shoe. You should be able to walk without excessive up and down motion on your foot. Stand on a slant board or with your foot off a step. Your toes should not touch the end of the boot.

Some companies will allow you to take home a pair of boots and wear them indoors for a short period of time to determine if they fit properly. If you are fitted in a store, be sure to wear them for a while to determine any discomfort. Women should be fitted with women's boots.

WEIGHT

Boot weight generally ranges from 3 to 7 pounds, although many boots made today are less than 3 pounds. More important than actual weight is a stiff heel counter and toe counter to protect the feet.

A novice should be willing to buy a quality boot. It is estimated that the average hiker's feet make contact 2,500 times a mile. A boot used a few times a year will last a long time.

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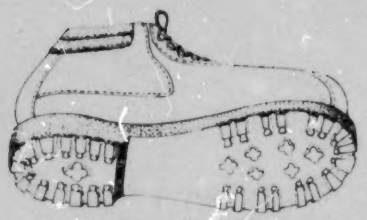
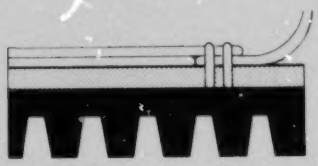


Rubber lug soles are popular, but not always needed.

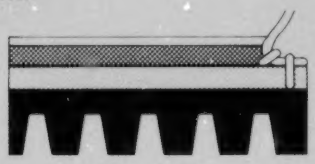
WELTS



Littleway—*This inside-stitched construction is best for lightweight boots.*

Goodyear—*This welt may come apart and is difficult to repair.*

Norwegian—*This welt, which is easily repaired, is recommended for heavy boots.*



An outside stitchdown such as this with only one seam holding the boot together can cause problems.

CONSTRUCTION QUALITY

Give careful consideration to the quality of construction in footwear. Rubber-lug soles are popular today because they protect and support the feet.

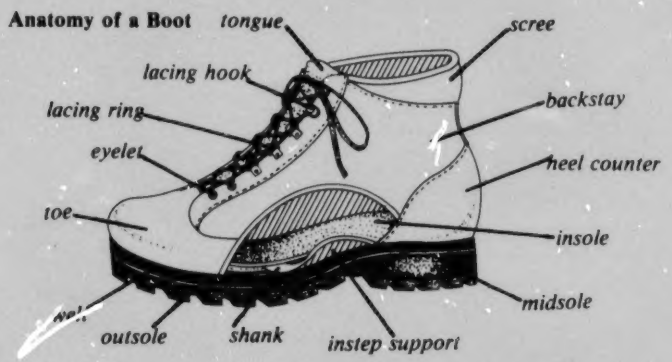
Vibram dominates the market for rubber-lug soles. Vibram soles come in varying hardnesses and several designs that range from shallow, soft, flexible boots to boots with deeper tread and harder rubber. Some hikers, however, are leaving lug soles at home when hiking fragile terrain or trails, such as the steep hills along the Missouri and Mississippi rivers. If you are hiking rocky trails with a heavy pack, a steel shank in the arch and a stiff sole will protect the soles of your feet.

Sole construction is important as it determines flexibility, comfort, longevity, and the possibility of future repair. Avoid boots that are glued together only. A midsole—the cushion between foot and ground—is a must.

Also check the welt (the narrow shelf where the upper leather meets the sole) for the type and amount of stitching between the sole and upper boot. Inside stitched construction (Littleway welt) helps keep out moisture and dirt; however, the boot is less flexible. Outer welt construction (Goodyear welt or Nowegian welt), which is more common, is durable and functional. Price of the boot goes up in the progression from cemented to Littleway to Goodyear to Norwegian welt.

The quality of leather used in upper boot construction is critical to fit, comfort, and protection. The best leather is top grain, which is leather made from a layer including the outer surface of the hide. When a hide is split, interior layers are not as strong or water-resistant as the outside layer. If the boot is made with the outside or grain side out, the leather is smooth. If the inside or flesh side is out, the leather is called "rough-out." While a rough-out looks like suede, suede is split leather that does not include the outside of the animal and, therefore, is not as good a quality. The important distinction is whether a leather is top-grain or split.

There should be a minimum of seams since seams can cause leakage, separation, and friction. Boots need to "breathe," or allow moisture to escape, so feet and socks do



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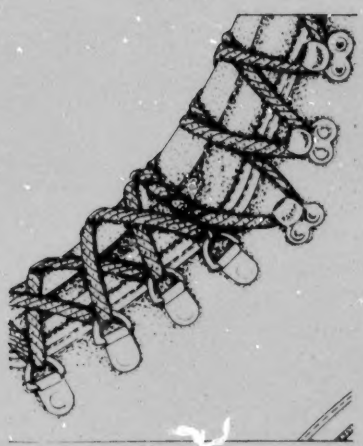
not become wet from perspiration. To keep your feet warm in winter, however, it's a good idea to waterproof your boots (see section on care). For subzero temperatures you may need an insulated rubber boot.

If you are going backpacking in cold temperatures, look for a boot with a removable insole. The thicker the insole and the smaller its air spaces, the warmer your feet. Carry extra insoles and change them to keep your feet drier and warmer.

A quality boot will contain a support for the instep and toughened toe. A pad (scree collar) is usually around the top of the boot. Some have a webbed tongue for additional water protection.



This boot combines rings and hooks for easier lacing.

LACING

The most common lacing involves eyelets (holes), hooks, rings, or a combination. Eyelets seldom pull out, but they take time to lace. Hooks save time lacing, but tend to break. A combination of "speed lacing" and rings is convenient if the weather is cold and your fingers are stiff. Braided nylon laces are strong, durable, and resist weather.

A recommended lacing method is to lace to the top of the boot, then lace back downward two or three rows and tie the knot. This gives more support and keeps lacing secure. If toes are cramped, lace lower area loosely, tie knot, and lace upper area tight. For downhill hiking reverse this process.

BREAKING IN

All new boots need to be "broken in." To prevent blisters, wear new boots around home for varying periods of time each day, building to at least one hour. Then wear the boots for a few short hikes and gradually culminate with a weekend trip using a light pack on an easy trail. Most experts suggest a break-in period of 4 to 6 weeks. Be sure to wear the socks you plan to wear on the trail.

If a quicker break-in is absolutely necessary, you can put on wet wool socks and wear your boots till the socks are dry. Or, you can put on the boots, stand in a bathtub of tepid water until boots are soaked, and walk in them until they are dry. Your boots will last longer, and your feet feel better, however, with a slow, careful break-in.

CARE

To care for your boots, follow the manufacturer's recommendations. It's important to know how your boots were tanned so you know how to condition and waterproof the leather. Most top grain leather boots are tanned with either a vegetable or natural oil. Many leathers are also silicone impregnated. The general rule is oil on oil-tanned leather and silicone on chrome-tanned leather.

Once dirty or scuffed, your boots need to be cleaned. Wash an oil-tanned boot with warm water and scrub the leather with saddle soap. When the boots are half dry, apply

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Do not dry boots by a campfire. It will destroy the leather.

a leather conditioner. After the leather is completely dry, restore the color and shine with a wax type shoe polish. Apply a waterproofing mixture whenever your boots need it. Do not use straight neat's-foot oil for waterproofing.

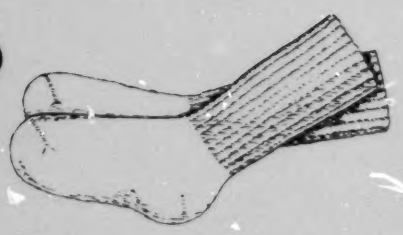
A silicone impregnated leather boot should be washed in water with a pH-balanced treatment like Lexol. Let dry, then apply a liquid waterproofing that is at least 15 percent silicone with mineral spirits. Give two applications.

Don't forget to wash the insides too. Remove the insoles and scrub out the inside of each boot, using water sparingly. The inside can be powdered or sprayed with fungicide.

If your boots get wet, do not dry them by forced or artificial heat. Let them dry at normal temperatures. If at home, stuff wadded newspapers inside to absorb moisture gradually. Some backpackers dry their boots by changing to dry socks often, which absorbs moisture.

In camp, do not dry them by the fire, which is a sure way to destroy leather. Also be careful not to warm your feet, in boots, too close to the fire. This will damage the leather and make your boots stiff.

Socks



Whether you wear thick or thin socks is a matter of personal preference, as is the choice of wearing one or two pair. What you want to avoid is blisters, which are caused by moisture and friction. A thin inner pair of polypropylene, silk, or wool socks and an outer pair of heavier wool socks will help prevent blisters. When wearing two pairs of socks, be sure the outer socks are big enough so they don't cramp or wrinkle the inners. If you prefer only one pair, you can buy a sock that is a combination of wool and polypropylene, nylon, or cotton, which will wick moisture away from your feet.

The two major criteria of a sock to keep your feet warm are resilience and sweat absorption. A sock must spring back to its original shape when your weight is off it. Wool has the greatest resilience. It also keeps your feet drier because moisture from perspiration passes through the sock and condenses in the cooler part of the fabric. For resilience, sweat absorption, insulation, and general comfort, wool is the best thing you can have on your feet. It's also one of the few socks that will keep your feet warm when wet. It does, however, wear out quickly, especially in the heels and toes; it doesn't stretch; and it shrinks easily. That's why some people prefer a blend of wool and nylon or wool and cotton. Silk, next to wool, is the warmest, most absorbent fiber and makes a good inner sock since it is comfortable.

Providing that an inner sock does not cramp your feet in boots, it's a good way to increase the warmth of your socks. Do not make the mistake, however, of trying to keep your feet warm by wearing several pairs of socks. In most cases, this only constricts circulation and your feet are colder instead of warmer.

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Be sure to carry several extra pairs of socks and change your socks frequently, especially in cold weather. Clean, dry socks will keep your feet warmer. Dirty socks insulate poorly, absorb less sweat, and increase the chance of blisters.

CARE OF FEET

Your feet are your wheels on the trail—your foundation of support. Be alert to any sign of soreness or blisters (such as a warm spot) and treat immediately. Check that your socks are not bunched. Use moleskin if the skin is red or tender.

To apply moleskin, remove the backing, cut it to size, and place it on the spot that is being rubbed. Do not place moleskin directly over a blister or broken skin. In this case, protect the blister by cutting a piece to fit around it, not over it. The best time to apply moleskin, however, is *before* a blister forms. Stop at the first sign of rubbing and use your moleskin.

Change socks frequently if perspiration is a problem. Dry your socks by attaching them to the frame of your pack. Wash your feet daily. Powder or rubbing alcohol will help soothe tired feet.

Shoes

A modern-day running shoe with a good arch support should be adequate for light hiking. It's always a good idea to have an extra pair of shoes for wading in streams or to change into when in camp. This allows you to rest your feet and gives your hiking boots a chance to dry. Tennis shoes or moccasins are good for this purpose. In winter, down- or polyester-filled booties keep your feet warm and are comfortable to wear around camp.

Layer System

1st layer

2nd layer

Clothing

GENERAL

No standard list of clothing will fit all backpackers. Most backpacking takes place in temperate weather from spring until autumn. Anyone hiking in winter weather or the mountains should have previous backpacking experience and special equipment to deal with the elements.

When determining your clothing needs, consider weather information and length of trip. Clothing should be durable, light in weight, and do what it is supposed to do. Comfort and safety are both important. If you are dressed to stay cool, be careful not to get sunburned. Your clothing should protect you from the sun and heat as well as the rain and cold.

In cool weather, the *layer system* seems to provide the best insulation and is easy to adjust for warmth. The idea is to wear several thin garments instead of one heavy layer of clothing. As you exercise and become warm, simply remove a layer of clothing.

Wool is an important fabric because it repels water well and, when it does get wet, still keeps you warm. It is

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3rd layer

Rain layer

Note to instructor: *Refer to* Basic Principles *module for more information on the layer system and types of clothing.*

relatively inexpensive if purchased at a military surplus store, and it endures for many years.

Ordinary underclothing usually will suffice on most trips. Take several sets so you can change if you perspire heavily. Fishnet undergarments are popular now because they allow moisture to escape while still keeping you warm. There are several synthetic blends that wick moisture away from your body. Insulated underwear is good in very cold weather.

Take both long pants and shorts when hiking. Long-fitting pants protect you from scratches, insects, and cool, damp weather. Although some people prefer jeans, jeans are heavy and hard to dry if they get wet. Shorts are always enjoyable when the weather is warm and the trail clear of obstacles. Make sure you have adequate pockets and a belt or suspenders.

A long-sleeved, cotton/wool shirt with button front, high collar, and long shirttail is a good all-weather choice. It protects you against the elements, as well as insects, bushes, and branches. If you become warm, you can unbutton the shirt and roll up the sleeves. It's usually a good idea to take an extra shirt or sweater in case temperatures drop. A jacket can be heavy, weighing 2½ to 4 pounds. A down-filled jacket is lightweight if you need the additional warmth.

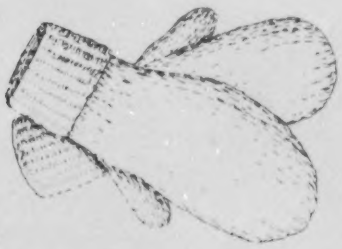
If you are going into wilderness where there is a great deal of rain, wind, and cold weather, you will need a windproof and waterproof parka with attached hood. It should have drawstrings to close the hood and area below the waist, and Velcro or snaps for the cuffs. A long zipper with a flap that snaps closed over it will help seal out rain and cold.

Although you may have to spend a little more, you can buy a waterproof outfit that is lightweight, compact, and will allow moisture to escape. If you will be exercising heavily and perspiring, avoid using a heavy waterproof garment that doesn't allow your body moisture to escape. If your clothes become wet with perspiration and it's cold, you can chill quickly and possibly develop hypothermia (lowering of body temperature).

Although somewhat heavy and cumbersome, a poncho is good protection against the elements and, when combined with rain chaps, will keep you dry. If you get a poncho, it can also cover your pack and that is important if your pack is not waterproof. In a pinch, a poncho can be used as a ground cloth.

If your feet get cold, put on your hat.

Weather conditions dictate your head covering needs. The head radiates more heat than any other part of the body; therefore, in cold weather a wool knitted cap will reduce heat loss. In warmer weather, a broad-brim, full-crown hat increases ventilation, reduces sun glare, and protects you from the sun. Soaking your hat in water will also help keep you cool.



Mittens are warmer than gloves.

In cold weather, mittens are warmer than gloves. Gloves

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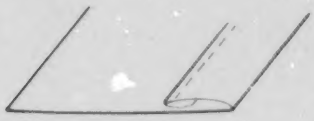
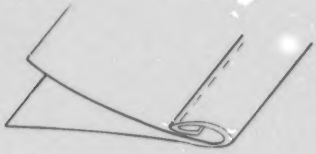
Note to instructor: Check military surplus stores and the Salvation Army for inexpensive used clothing and equipment.

Good seams for outdoor equipment



Finished hem



Finished hem seam

Flat-felled seam

are handy, however, if you are going to gather wood, work with fire, cook, or do other chores. Fingerless gloves may work best for intricate tasks.

SPECIAL CLOTHING

Anyone hiking in winter or in mountain areas must be prepared for freezing weather or sudden drops in temperatures. You will need special equipment to deal with the elements. Some suggested items are insulated underwear, wool shirts, wool sweaters, wool pants, rainwear, gaiters (these fill the gap between pants and boots and keep your legs dry), overmittens, heavy insulated parka, down pants, down boots, balaclava cap, scarf, bandanna, and sunglasses or goggles.

CLOTHING CONSTRUCTION

Seams in outdoor clothing must be strong and well made. Nearly all seams should be finished so edges cannot ravel. Only coated fabric can be left with a single line of stitching. Clothing should be sewn with flat-felled and hem seams (see illustration).

Backpacks

Note to instructor: For information on the 1984 backpacks, see Backpacker *magazine, January 1984.*

Your most bewildering selection will probably be your backpack since there are more than 300 varieties on the market today. It's an important decision, however, and you should make it as carefully as you would choose boots or a sleeping bag. When selecting a pack, comfort and function must be considered.

TYPES

Distance and the length of time on the trail help determine what backpack you need. Longer distances, more time on the trail, more gear to carry, and personal comfort narrow your options.

Daytime hikes call for a soft pack, rucksack, or knapsack. These packs are designed to carry enough gear to last for a day or two. They are light, comfortable, practical, and excellent for climbing or skiing trips. They are built with one or two compartments and designed to carry 15 to 20 pounds. Such soft packs can be purchased with or without a frame and usually are made of canvas or nylon material. When shopping for one of these, look for padded shoulder straps and waterproofing. For longer trips, the expedition pack is larger and allows you to carry heavier loads because of its more rigid frame. Modern backpacks give you a choice of either external or internal frames.

Rucksack or knapsack for daytime hikes.

EXTERNAL FRAMES

The external pack frame is made of lightweight tubular metal or plastic, contoured to fit the body, and can be carried high near the body's center of gravity. This allows the weight to be distributed to the shoulders, back, and hips.

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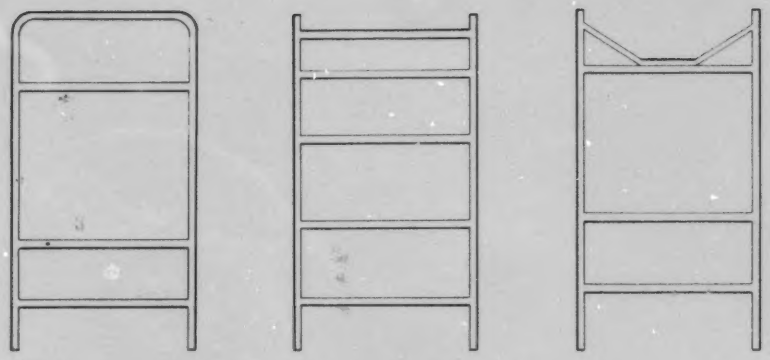


Backpack frames should have a minimum of four crossbars. Check the joints where bars are joined.

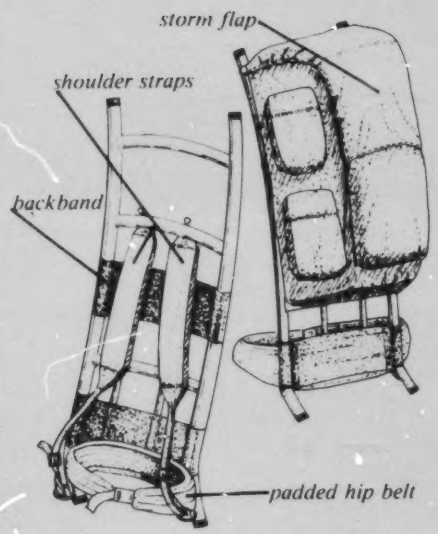
Shoulder and waist straps help absorb shock and transfer weight to the hip area.

Backpack frames are commonly aluminum or an alloy of magnesium, although recently, molded plastic frames have been introduced. Frame designs come in "H" and "U" shapes with supportive bands and straps. There should be no less than four crossmembers. How the frame is joined is important to its durability. Heliarc welded joints are strong, but be sure to check the workmanship and reject any joints that are cracked. Welded joints give the frame the stress strength necessary to support the rigors of long hikes. Brazed, soldered, and bolted joints may be satisfactory, depending on the quality of the workmanship.

When shopping for a frame, you can do a simple test to check how strong it is. The greatest stress on the frame comes when you set a pack down with the weight on one leg. Therefore, stand the frame on one leg and carefully increase pressure to determine its strength.

You can use the frame to transport other items besides the pack bag. On some models, the frame extends to carry more equipment or to better adjust to the packer. One of the newest models even has a frame that folds to make a portable seat to use in camp.

The padded shoulder straps should be wide enough to avoid chafing and their length adjustable. Back-bands of wide padded nylon, mesh, and plain nylon protect and support the weight of the pack on the back. Hip belts should be padded, come in one piece, and have a quick-release buckle. Holding the frame and load close to the body helps shift much of the weight to the hips if the belt is snug. On many of the new packs, hip belts can be raised or lowered on the frame to adjust for different torsos.



Packs should have padded shoulder straps and hip belt.

Purchase a pack bag that is intended for the frame. Some bags come in sizes that fit the full frame lengthwise while others are a three-quarter length. They can be attached at the top or at a lower point on the frame for better balance. Better bags today are made of tough material like Cordura nylon that is taped for extra protection of the load. Bags are designed with one large compartment and several pockets or two large compartments and a number of pockets on the sides and upper rear. Nylon zippers are preferable to

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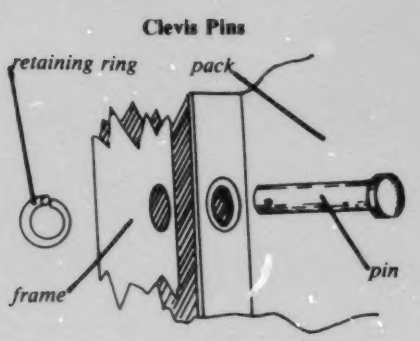

Clevis pins are used to attach a pack bag to the frame.

metal because they resist weathering. Zippers should be covered with a protective nylon flap to keep out rain. It helps if the top rain flap is large enough to protect the contents when loaded or even overloaded, but not all bags have this feature. The stitching both inside and outside the bag and on the belts should be with a durable nylon or cotton-wrapped nylon thread and 8 to 12 stitches per inch. Seams and stress points are always vulnerable—check these closely. They should be reinforced with at least two rows of stitches.

Bags are attached by clevis pins and lock wires or rings. The pins go through the eye grommet of the bag and frame and are secured by the wire or split rings.

You will need a rain cover or poncho if you hike continuously in incliment weather. A large garbage bag makes an effective cover when the pack is not being worn, as in camp.

INTERNAL FRAMES

An alternative to the frameless rucksack and the external frame pack is the internal frame pack. It is a backpack that looks like a large rucksack but which has internal stays that contour to the back. The stays are generally parallel to the spine or form an X across the back. Many of these packs can be form-fitted to the user by adjusting the stays.

Early on, internal frame packs were used by young travelers going overseas who didn't want to carry a suitcase, yet didn't trust frame packs to withstand the rigors of busses and trains.

Today, internal frames reflect some of the most modern designs that combine the newest technology with space-age materials. They are preferred by some alpinists who carry heavy gear and provisions into the mountains. Front and side compression straps keep the load tight and make it easier to carry heavy loads. Sleeping bags can be neatly tucked away and protected in a lower zippered compartment.

If you are shopping for an internal frame pack, check the following:

Packbag: Look for contouring. A tubular bag that isn't contoured will roll from side to side.

Material: The material should be rugged but it doesn't need to be heavy.

Construction: Look for craftsmanship, such as 8 to 10 stitches per inch and stress points reinforced. Try pulling out the lower shoulder strap attachment. Seam taping or binding inside the pack is a sign of superior quality.

Buckles: Plastic Fastex cinch buckles are recommended on all but the shoulder strap adjustment where you should look for a metal spring buckle.

Foam: Thickness doesn't always mean good quality. Use Lowe and Gregory packs as good examples of hip belts and shoulder straps.

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Make sure your pack fits you and can be adjusted as needed.

Adjustability: Don't buy the "one size fits all" sales pitch. Make sure the pack fits you and can be adjusted as needed.

FIT

The frame pack must be comfortable and fit properly. Most models come in three or four sizes, ranging from small to extra large. Place about 30 pounds of books or other materials in the pack and adjust the shoulder straps and hip belt to simulate a realistic load.

Take an indoor walk with the pack to determine its feel. Check that weight is evenly distributed on shoulders and hips. Is it comfortable when walking? As a final step, check the warranty on the pack. Warranties run from one full year to unconditional for the lifetime of the original owner.

STUFF SACKS

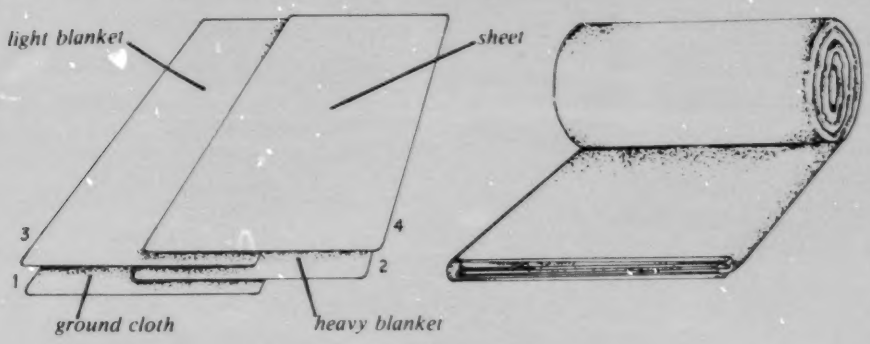
All-purpose stuff bags of different sizes and weights can be used to carry sleeping bags. Lashed to the bottom of frames, these bags of nylon waterproof material weigh only a few ounces, protect your bag, and are easy to handle. They are also good for carrying clothing, food, or other items you want to keep separate.

Sleeping gear

Your bed gear is important because it can affect your rest on the trail. A good night's sleep can work wonders to erase the fatigue of a strenuous hike, restore morale, and prepare you for a new day. Since about a third of the time involved in the trip constitutes sleeping, selection of sleeping gear becomes critical. It ranks in importance with footwear and packs.

BEDROLL

Those who have been raised to use a bedroll, do not want to be encumbered by a bag. A bedroll usually consists of a sheet, light wool blanket, and a heavy wool blanket. A poncho or ground cloth on the outside protects the blanket and increases warmth. All layers can be rolled (as shown) and carried on a backpack.



To make a bedroll, assemble layers, fold each layer over, and roll as shown.

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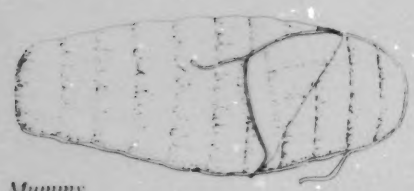
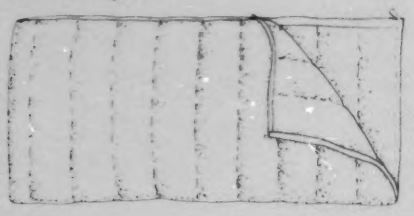


Mummy

Barrel or tapered



Rectangular

SLEEPING BAGS

Sleeping bags are constructed to retain body-generated heat. This is accomplished by creating dead air space which is the best insulation and the poorest conductor.

Shapes

Bags come in three different shapes or combinations: mummy, barrel or tapered, and rectangular. The mummy bag is preferred because it is contoured to the shape of the body and is warmer. The main drawback to this bag is that it constricts the sleeper's movement. For this reason, some prefer the barrel bag which is contoured to give more space at the middle of the body. The rectangular bag is losing popularity because it has more area to insulate, and therefore weighs more.

Fillers

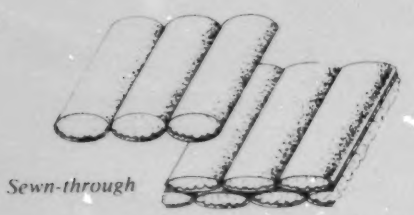
One of the most popular bag fillers is down taken from geese or ducks. Its advantages are that it is lightweight, compresses well for carrying, expands when released, is durable, and has a wider comfort range than synthetics. It does, however, lose its effectiveness if it becomes wet and it is expensive.

Synthetic fillers also are available and manufacturers are improving their abilities. These include polyester, rayon, and foam and are sold under trade names such as Hollofil, Quallofil, and PolarGuard. They are less expensive than down and perform better when wet; however, they are slightly bulkier and heavier. Avoid cheap polyester batting for it is too heavy and bulky for backpacking.

Loft, or thickness, determines how warm the bag will be.

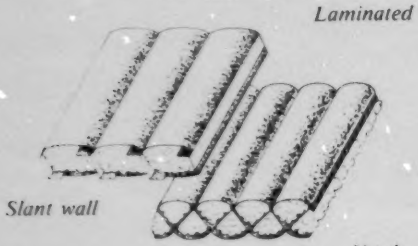
The warmth of a bag is determined by its thickness, or loft, from bottom to top when it is fluffed out and laid flat. The greater the loft, the greater the amount of dead air space provided in the construction.

To keep the filler from shifting and lumping, which decreases insulation, separate compartments or baffles are sewn to hold the filler. Straight sewn-through construction is simple but allows for cold spots where outer and inner shells are connected (see drawing). A laminated construction (as shown at left) solves the cold spot problem, but it makes the bag weigh more. Other methods of construction such as box, slant box or slant wall, and V-tube or overlapping use the baffle system to provide maximum insulation with the least weight. Baffles should be sewn no more than about 6 inches apart with 8 to 10 stitches per inch. Stitching should be even and straight and double-sewn at stress points such as along the zipper.



Sewn-through

Laminated



Slant wall

V-tube

Manufacturers of synthetic bags are experimenting with radiant heat barriers in their bags. These shiny films resembling space blanket material, when placed either in the bag's liner or in the insulating layers, reflect body heat and lower comfort ratings by about 10 degrees. Using a vapor barrier liner will also lower the comfort rating by about 10 degrees to keep you warmer in below-zero temperatures.

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Vapor barrier liners are coated, impermeable nylon sacks that trap perspiration, and thus prevent evaporative heat loss.

Cover fabric

Ripstop or taffeta nylon is a good inner and outer cover fabric. It is lightweight, will not lose filler, and is breathable, durable, wind resistant, and water repellent.

Zippers

Zippers usually come in three lengths—around the bottom, full length, and three-quarter length. Two-way zippers allow for optional ventilation at the foot. Metal zippers conduct cold and are heavier than nylon zippers. The side wall of the bag as well as the zipper side should contain down-filled baffle or nylon tube adequate enough to prevent heat loss. Get in the bag and see if you can operate the zipper without catching the draft tube.

Fit

Make sure the fit is comfortable. Winter packers usually buy a larger bag so they can store equipment inside it.

Hood

The head must be covered in cold weather. Your bag should have a drawcord around the hood and a locking device to keep it closed. Check to see if you can operate the drawcord from inside the bag. A lightweight bag may not need a hood and some people prefer to sleep with a cap on instead of using a hood.

Selection

When selecting a bag, consider these factors: seasonal use of the bag, range of temperatures, body metabolism, frequency of use, weight of bag, warmth of bag, and expense. Purchase the bag from a reliable dealer whose reputation is positive. Be willing to spend extra dollars for a good bag. With proper care it will last years.

Most hikers want a bag designed for three seasons—spring, summer, and fall. A medium-weather bag usually will suffice for these seasons. You should be warm enough with 1½ pounds of down or 2½ to 3 pounds of a good synthetic filling. Temperature, wind speed, and humidity, however, also affect warmth. Some hikers will be warmer than others under the same conditions because of their body metabolism. Other factors which can help make you warmer are eating food or drinking warm liquids, sleeping inside a tent or shelter, using a sleeping pad, setting up a campsite out of the wind, putting on more layers of clothes, and using two sleeping bags. To sleep at the manufacturer's temperature ratings, you must be in a tent where wind chill cannot affect the bag and you must use a foam pad underneath your bag.

If you become too warm, you can always remove clothing or unzip your bag and expose head, arms, and shoulders for ventiliation.

Care

Take care of your sleeping bag. A wet sleeping bag is extremely uncomfortable; therefore, it's important to keep your bag dry. Use a pad underneath to help insulate you from the ground. If the air is dry, turning your bag inside out or unzipping it completely for an hour or so in the morning will allow moisture that may have accumulated overnight to evaporate. Be especially careful around a fire so sparks do not burn holes in the bag. On the trail, keep your bag in a stuff sack or wrap a cover around it so it isn't snagged on the pack. When you return from a trip, brush and air out the bag to dry body moisture and decrease mildew and body odors. Too much sunlight, however, can damage the down and decrease loft. Do not store a sleeping bag in a stuff sack; rather let it lie flat so it will loft. Never yank or pull on a bag for this can damage baffles. Before you clean your bag, read the manufacturer's recommendations, talk to outfitter establishments concerning cleaning, and ask other packers how they clean their bags. Then decide on your course of action. Many bags have been destroyed by improper washing. Some cleaners who are knowledgeable will clean or wash bags. Synthetic bags should be washed. If you dry clean a bag, check with the cleaner and make sure it is cleaned with a non-toxic solvent.

To wash a bag, hand wash it in the bathtub with gentle soap or use a nonagitator machine on gentle cycle. Use detergent designed for down bags. Rinse it gently and press out as much water as possible. Lift the water-soaked bag in your arms and place it in an automatic front-load dryer set on low or no heat. Place a pair of sneakers in the dryer with the bag to fluff the down or fill. Gently remove it and finish drying by airing. You also can use a removable inner liner that can be washed to save cleaning the bag so often. A repair kit is helpful to immediately repair rips, tears, and burns.

ACCESSORIES

A sleeping pad provides insulation from cold and dampness and some comfort. Closed-cell foam pads may be Ensolite or polyethylene. Both are waterproof and efficient. Open-cell pads provide good support but will absorb water.

Sleeping pads

An air mattress will provide more comfort than protection against cold and dampness. It also is subject to punctures, needs to be inflated and deflated each day, and is bulkier and heavier than most pads. Other pads, including a sophisticated self-inflating one, are available if you want to spend the money.

Even if you sleep in a tent with a floor, a ground sheet or tarp inside the tent is recommended to protect your bag from moisture and abrasion. If you use a tarp under the tent instead, make sure edges are tucked in so they won't collect water.

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Shelter

Your best all-around shelter is a tent.

Some type of shelter is recommended for all backpackers. Even though the open sky is beautiful and sleeping under the stars can be a memorable experience, you need to be prepared with some form of shelter in case you have inclement weather or an abundance of insects.

TENTS

Tents offer the best all-around protection against the elements and insects. Tents are an expensive piece of equipment, however. You may want to rent a tent from an outdoor retailer or outfitter or borrow one from a friend before investing. Doing this will give you a chance to decide on the features you want.

Types

Tents are designed for seasonal use such as spring, summer, and fall; severe winter weather or alpine conditions; and protection against wind, rain, and snow. Each has merits to fit particular needs.

The most common shapes for tents are the dome/semi-dome, A-frame, or tunnel tent. These are usually staked for support; however, new versions are self-supporting. A self-supporting tent can be picked up without dismantling and moved to another location. It sets up well on gravel or hard ground, although it should be staked if it is windy.

The average backpacker should consider purchasing a three-season, A-frame, two-person tent. This type of tent is approximately 7 feet long, 4½ feet wide, and 4 feet high. It should weigh about 6 pounds.

Many older tents are made of canvas. Its advantages are that it repels water, disperses condensation, and is wind resistant and durable. Since it is heavy, however, it is more appropriate for car-camping, resident, or base-camping. It also mildews and can tear more easily than other fabrics.

Nylon is a more popular tent fabric because it is lighter and stronger than canvas. It comes in two different weaves: taffeta, a flat weave; and ripstop, a two-thread, twisted weave. To be waterproof, nylon must be coated with polyurethane or vinyl. The weight of the coating helps determine how long the fabric will stay waterproof.

Nylon tents should be double walled, which means the tent has a rain fly that is waterproofed while the inner wall is untreated so it can breathe. Sometimes sold as "backpacking tents," some inexpensive tents have no rain fly and the roof is waterproofed. These do not allow moisture to dissipate and it often condenses inside the tent. These tents are *not* recommended.

Rain fly

The rain fly is guyed to stakes and poles used for the tent. It is positioned a few inches above the tent roof and shades as well as sheds water. Insect netting on the entrance and windows provide ventilation and reduce condensation inside the tent.

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Construction

Thread count is the most important factor in a tent's construction. The greater the number of threads in one square inch of material, the tighter the fabric. High thread count fabrics are more resistant to weather, wind, and abrasions.

The floor of the tent should contain as few seams as possible, be waterproofed, and extend upward on the sides to a height of about 12 inches. (This is called tub floor or wraparound.) Flat-felled seams and a variation of lock-stitch sewing add strength. A good tent withstands wind better if it has a catenary cut. This is a natural curvature designed when the fabric is cut and sewn. It reduces sag, wind flapping, and stress on seams.

A better tent will be reinforced at points of stress: the pole or peg loops and the pole sleeves. Sturdy grommets also will prevent the fabric from tearing. Other features to consider are the zipper, which should open from both the inside and outside of the door and net.

Poles

The tent poles should be durable and easy to assemble. Most poles are made of aluminum so they are light and strong. Fiberglass and magnesium poles are used in some designs, and these are sturdy and portable. If the sections, approximately 18 inches in length, are connected by shock cord, they will be easier to handle when pitching and striking a tent. Pegs sold with the tent may not be suitable for the terrain traveled. Aluminum skewers, which are easy to put in and remove, will serve most areas. Stamped stakes may be necessary in some soils.

Selection

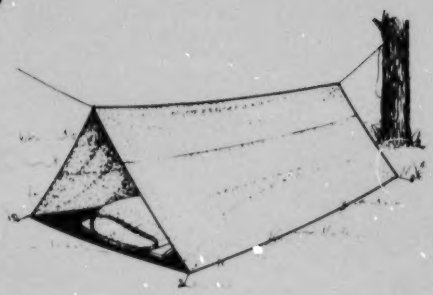
To select a tent, define your needs: weather, season, weight, material, ventilation, size, pitching and striking ease, and durability. Ask around, shop around, compare prices and look at warranties, check the firm's reputation and reliability, then make your purchase.

Care

To care for your tent, keep it away from sparks and flames. Look out for sharp objects on the ground. Wipe up spills and whisk out debris. Repair punctures with adhesive ripstop nylon tape. Seams should be sealed with a seam sealer so they don't leak.

Never store a tent wet. It will mildew. Dry it in the air and sunshine. When packing, avoid folding it on the same lines, which weakens the fabric. Stuffing or loosely rolling the tent in a stuff bag avoids this type of damage.

If you must wash your tent, do it by hand, not in a machine. Always read and follow the manufacturer's recommendations.



Tube tent

CANOPIES

Some backpackers who hike infrequently may not want to purchase a tent. Some of the more hearty would rather brave the elements with the least amount of covering.

A poncho is probably the simplest shelter. With a few feet of cord and some stakes, you can construct a simple canopy to give minimum protection. A canvas or nylon tarp or a 9 x 12 foot polyethylene sheet used with stakes, poles, and line can provide a suitable shelter also. A tube tent is another inexpensive means of protection, but it is not very durable. This type of shelter can be hung on a ridge line at the top, and the bottom held in place by sleeping bag and other equipment.

For most people, however, the quality and pleasure of a backpacking trip improves with the use of a tent.

Essential equipment

Optional equipment might include camera, fishing gear, binoculars, pedometer, guide book, paper, pencil, playing cards, reading material, or whatever items you are willing to carry to increase your enjoyment and comfort. Portable radios, however, are best left at home.

Optional equipment

Equipment needs vary from person to person. Experience, length of trip, season, size of group, and location influence the selection of equipment. Experienced backpackers are well prepared, but carry as light a load as possible. The equipment checklist in Appendix 2 is a guide for backpacking. It includes the essential equipment that should always be included. Don't forget the first aid kit!

Cooking

Food

A backpacker needs food that is highly nutritional, lightweight, easily prepared, resistant to spoilage, and inexpensive.

Note to instructor: The Backpack Cookery *and* Campground Cookery *modules include information on meal planning and preparation, recipes, equipment, and fire building. Consult these for more detailed information on cooking.*

TYPES OF FOOD

Backpack food is referred to by a number of different terms. Lightweight, recreational, packaged, dried, dehydrated, instant, powder dry, freeze dry, and air dry refer to foods that have had the water content removed. The processes used to remove the water vary in complexity and expense.

Freeze-dried foods are packaged in aluminum foil, while dehydrated foods are usually sealed in plastic. Check dates on packages. Plastic-wrapped foods are best used within a year because they will spoil. Foods wrapped in foil don't have such a short shelf life (one company says their foil-

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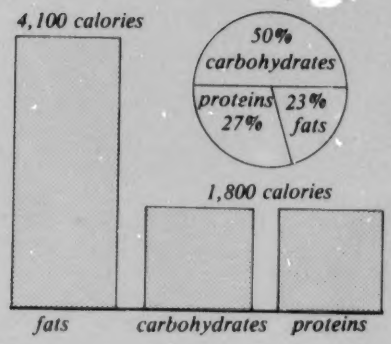

Basic GORP Recipe
1 cup peanuts
1 cup raisins
1 cup M & M candies

Mix together and package in individual plastic bags. Substitute or add cashews, walnuts, shelled sunflower seeds, chopped dates or other dried fruit, and coconut. In winter you can use miniature marshmallows, chocolate and butterscotch chips.

Note to instructor: Trail snacks are important to maintain energy as well as offer a refreshing break on the trail. Each student should have a personal supply of snacks.

wrapped packets are good for 10 years). Just be sure to pack out the non-burnable metal wrappers.

The finished product, depending on process and food type, may vary in appearance, flavor, nutrition, preparation time, and weight. Outdoor equipment stores, health food stores, and supermarkets handle foods of this nature. Dried foods sold in supermarkets are less expensive sometimes and give you a wide variety of menu choices.

NUTRITION

There is no perfect menu and food selection will depend on a number of varying factors. A vigorous packer uses between 4,000 and 5,000 calories per day. This is divided into approximately 50 percent carbohydrates, 30 percent proteins, and 20 percent fats. Usually, 2 to 2½ pounds of lightweight food per person per day meets this requirement. The proteins maintain muscle function, fats supply long-term energy, and carbohydrates supply fast energy.

EATING HABITS

Some meals can be eaten cold, some will require cooking or simmering, and others are of the instant variety, prepared merely by adding boiling water. If you are new at backpack cooking, it's a good idea to plan your meals ahead and even practice preparing some of them.

Backpackers vary in their eating habits and energy requirements. Some eat the traditional three meals a day along with a trail snack such as GORP (Good Old Raisins and Peanuts). Others eat breakfast, skip lunch, snack during the interval, and prepare a full evening meal. Some prepare more elaborate meals while many cook only the one cup/one pot meal.

What you must remember, however, is to replace the calories you burn. To keep up your energy, you must eat properly. On the trail is not the place to diet. It's also important to eat high energy foods *before* you tackle a difficult trail, not just afterwards when you are tired.

PLANNING AND PACKAGING

Menus should be planned. Planning reduces expenses and provides only what is needed. Consider the preferences of *all* members of the group. Vary menus so meals don't become monotonous. Remember, food can make or break a group when other factors are less than optimal. (See *Backpack Cookery* module for meal planning ideas.)

Most packaged foods come in servings for one, two, or four people. Directions, weight, and contents are printed on the package. The U.S. Department of Agriculture, university extension offices, and libraries have publications with more detailed information on food if you want it.

To package the food for your trip, you can prepare ingredients for each meal and package separately or you can put together all breakfasts in one large package, lunches in

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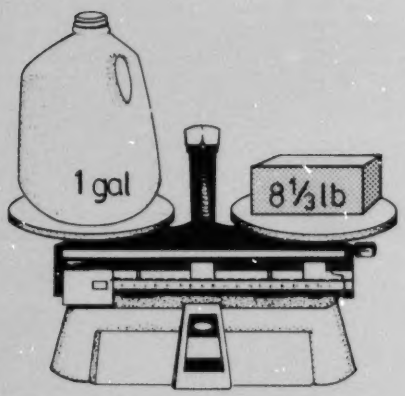
another, and dinners in a third. Another method is to package food by days, with each package marked accordingly.

PREPARATION

With the foods available today, preparation is relatively simple. You can choose a cold meal, such as a breakfast consisting of fruit drink, instant cereal mixed with raisins, and topped off with half of a meat bar. The noon meal might consist of lemonade, cheese, peanut butter, crackers, and half of a candy bar or a piece of fruit. The evening meal is usually the most substantial and might consist of instant hot chocolate or soup, stew, fruit slices, and pudding.

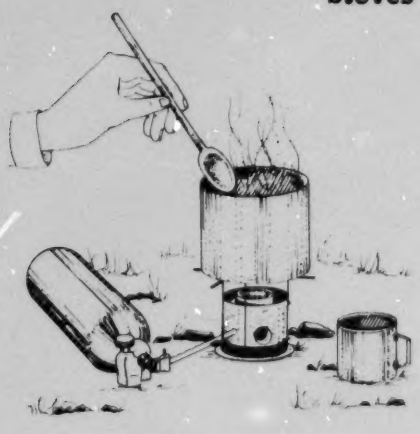


WATER

Although how much water you need on a trip can vary, most backpackers use approximately 4 quarts of liquid a day. In weight, that's at least 8 pounds. To avoid becoming dehydrated, you must keep drinking liquids, which means you must have a constant water supply. It's important, therefore, to be aware of water sources on the trip. If water is not plentiful or easily found, it must be carried. Allow 2 pounds per quart of water. Carrying a canteen, plastic container, or water bag, even on a short hike, is a must. You can survive for days, even weeks, with little or no food; but without water, you will live only a few days. (See section on purifying water, page 41.)

Stoves

Plan to carry a stove. When wood is scarce, regulations prohibit a campfire, an area is fragile (such as a glade or mossy forest floor), or you are tired and hungry, you will be glad to have it along.



Carry a backpacking stove whenever possible.

TYPES

Stoves are identified by the fuel they use and how they burn it and their size. When purchasing a stove, you should consider its price, the price of the fuel it burns, availability of that fuel, weight of the stove and its fuel, heating efficiency, safety, and convenience. Convenience includes durability, reliability, starting ease, operating time, and how well it packs.

FUELS

One-burner stoves are most popular with backpackers. They range in weight from 1 to 3 pounds. An expedition stove with more than one burner weighs more.

Stoves operate on liquid fuel, such as kerosene or white gas, or cartridges containing butane or propane. To operate, liquid fuel stoves must convert their liquid to a vaporous gas that expands by heat or pump pressure. Some newer models do not require priming. Both kerosene and white gas are common fuels and can be easily purchased locally. White gas

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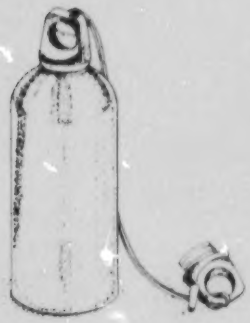
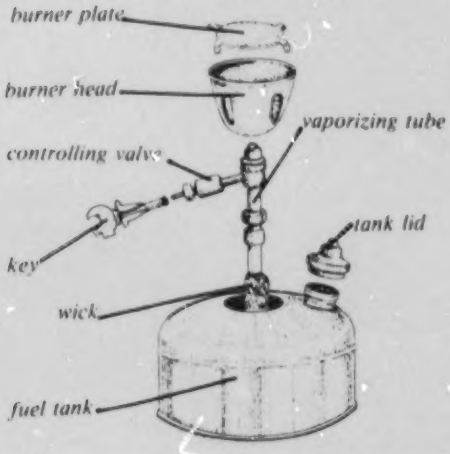


Fuel bottle with pouring spout

burns cleaner but it is more volatile than kerosene, which is safer but slower to start and creates soot. The cartridge stoves are simple to operate; however, there are some disadvantages. Their fuel is more expensive and less efficient in cooking time, they are difficult to operate in cold weather, empty cartridges must be carried out, and it is difficult to determine the amount of fuel used in burning. Extra liquid fuel can be carried in leak-proof pint or quart containers. How much fuel you need will depend on your stove, the type and amount of food you prepare, weather conditions, and altitude.

WHITE GAS	
Advantages	**Disadvantages**
Very lightweight	Priming period required
Spilled fuel evaporates quickly	Spilled fuel very flammable
Regular fuel used for priming	Efficiency lost in very cold weather
Fuel readily available	Difficult to start in wind
KEROSENE	
Advantages	**Disadvantages**
Spilled fuel not volatile	Priming period required
Snow or cold does not reduce efficiency	Spilled fuel evaporates slowly
Fuel cheap and plentiful	Hard to start in wind
BUTANE/PROPANE	
Advantages	**Disadvantages**
No priming required	Fuel relatively expensive
Fuel will not spill	Stove and fuel heavy
Immediate heat available	Lower total heat output
Will light in wind	Cartridge disposal a problem

Working parts of a white gas stove



MAINTENANCE

If you take care of your stove, hopefully you will not have many problems. Always follow the manufacturer's suggestions for operation and care. Newer stoves have built-in cleaning needles that clean the carbon build-up from the fuel jet. Fuel left in the tank and lines for a period of time causes gum build-up. When this happens a stove may need to be taken apart and cleaned. If you do not want to attempt it, take the stove to a shop.

COOKWARE

Single-burner stoves dictate one course meals. You will need a single aluminum pot that is thick on the bottom. It should have the capacity to hold 3 to 4 pints. If a second pot is needed, use a 2- to 3-cup capacity size that will fit inside the larger pot.

You can buy an elegant cook set, but it isn't necessary. Some people do well with No. 10 tin cans. By planning

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Cook kit

ahead you can eliminate any need for additional pots or pans. A lid for the pots also can be used as a skillet. If your pots do not have handles, take along a potholder, handle, or small pair of pliers.

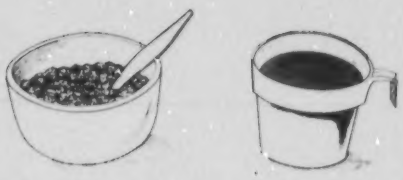
EATING AND DRINKING UTENSILS

A plastic or metal cup will serve as a mess kit. Metal has the disadvantage, however, of drawing heat away from beverages and food. Besides that, all you really need is a spoon and bowl. You can get as elaborate or simple as you want. Other useful items are plastic bags, tubes, and jars.

MISCELLANEOUS

Miscellaneous items include lid, gloves, pot lifter, and pocketknife. Shakers for salt and pepper are usually plastic. Some packers carry lightweight grills or ovens, but these require open fires. Waterproof matches and some type of fire starter should be included.

Many backpackers delight in eating on the trail because it offers a change to their normal eating habits. A well-planned meal, properly prepared, can make a good backpacking experience even better. If you are a novice, be sure you try out your stove, fuel, and food before you go on a trip.



A bowl, spoon, and cup are your essential eating utensils.

Navigation

Editor's note: Skill in using a map and compass is important for backpacking, whether you are out for a day or on an extended trip into wilderness areas. The Department of Conservation's Map and Compass *education module is a thorough guide to teaching basic map and compass skills. It is recommended that you teach it in conjunction with a backpacking class. For information on maps and compasses, consult the* Map and Compass *module.*

Before the trip

Before leaving on a backpacking trip, make every effort to gather as much information as possible about your travel area. Find someone who knows the area, who has been there before. Obtain all the written information you can. Gather information about landmarks or checkpoints that you can identify by sight and location on your map.

Alternate methods

A map and compass will provide the safest and most accurate method of navigation. Continued practice in their use should help you have an enjoyable and worry-free experience. While there are other methods of navigation, keep in mind that they have limitations and are not

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foolproof. You should always have a compass and a map of the area.

TRAIL ORIENTATION

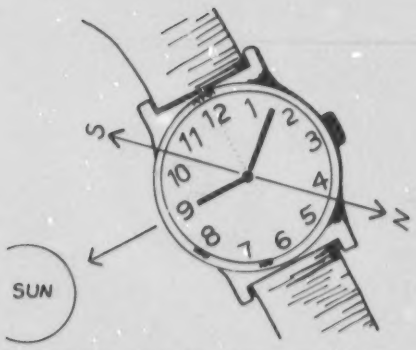
Trail signs are the most common. These are markers or indicators as to direction, location, or checkpoint. Unfortunately, vandals sometimes remove or change trail markers. Trails that are used by heavy traffic often will direct hikers to recognizable landmarks. Some trails will be identified by man-made objects such as stones or sticks pointing in a certain direction. Other trails will be identified by posters, tags, paint, or blazes. If a place is provided, it's a good idea to leave a trip plan at the beginning of the trail.

PEOPLE-USE SIGNS

These signs are crude and not altogether accurate. Soil will show erosion from packer impact. Debris, litter, and fire scars are evidence of hikers.

SUN AND SKY

The sun can be used with a watch to determine south. Point the hour hand at the sun. The point halfway between the hour hand and 12 is south (see diagram). Before 12 noon, bisect the angle formed by going counterclockwise from the number 12 to the hour hand. After 12 noon, bisect the angle formed by going clockwise from the number 12 to the hour hand. Don't forget to compensate for daylight saving time. (For other methods, see the *Map and Compass* module.)



Determining direction using a watch

The sun alone can provide general direction, and in some cases, knowledge of wind direction will help you. Clouds, fog, or rain, however, can disorient you. If this becomes the case, stop, rest, and determine a plan of action.

Procedures if lost

Do not panic! The best advice is never to travel alone. If traveling alone is necessary, be well prepared and use well-traveled trails. Make sure that someone knows where you are hiking and when you plan to return.

You may become disoriented rather than lost. Do not panic. Mentally trace the area you covered in the past 30 minutes. Sit down, relax, and study the map for possible checkpoints. Retrace your steps to that point, if possible, and recheck map and compass points. Try to follow your previously traveled trail. If you realize you are really lost, stay in one place.

You can avoid panic with a short rest and something to eat. Try to make contact by blowing a whistle, building a smoky fire, flashing a mirror, or yelling. Heavy smoke will attract some attention in populated or patrolled areas.

If it looks like you are going to have to stay out for the night or longer, select a sheltered site and pitch a tent. Check your water supply. Is it sufficient? Is there other water near?

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Build a fire and cook some food. Try to get warm and comfortable. Continue signaling. Remember that friends are aware of the trip and will respond positively.

Campsite

Selection

Selection of a campsite is particularly important from an ethical standpoint. You want your campsite to provide a pleasurable experience, yet you have a responsibility to take care of the environment. Camping can be hard on an area especially when vegetation is destroyed or wildlife disturbed. Recovery takes a long time.

Certain ecosystems are more resilient (able to recover without permanent damage) and can withstand more use than fragile sites. Examples of resilient sites are heavy forested areas with layers of leaves, prairies, dry grasslands, dry meadows, and rocky outcrops. Fragile sites are glades, sloped areas where erosion can occur, and areas with moss, lichen, or ferns.

Pristine area

You should always be sure to camp at least 100 feet from the trail and any water supply. If you are hiking a public trail, be sure to consult a trail brochure for camping information. Since trails sometimes cross private lands, camping may be restricted to specific sites.

Here are some basic guidelines for selecting a campsite:

1. **Pristine area—use with caution.** In low-use areas these sites are preferred because they recover quickly and don't invite repeated use. You should select a resilient site and not stay more than one night. If your party is large, have them spread out, select a site that shows no evidence of use, and leave no trace when finished. Do not use a grass-covered site more than one night.

2. **Lightly impacted area—use only if necessary.** These sites deteriorate rapidly with continued use unless they are particularly resilient such as rocky outcrops, dry meadows, or grasslands.

3. **Moderately impacted area—use when possible.** In popular places where impact is already evident, you should camp on already well-worn sites. If you're careful, you should not damage the area any more and you won't add still another site.

Moderately impacted area

4. **Severely impacted area—do not use.** If soil erosion is obvious, tree roots are exposed, and firewood is scarce, steer clear of this area and let the scars heal naturally.

When you choose a campsite, consider the weather. If it is cold, a valley will be warmer than the top of a hill. Camp out of or in the wind depending on conditions.

Selection of a campsite should not be hurried. Allow plenty of time—stop at least 1½ to 2 hours prior to

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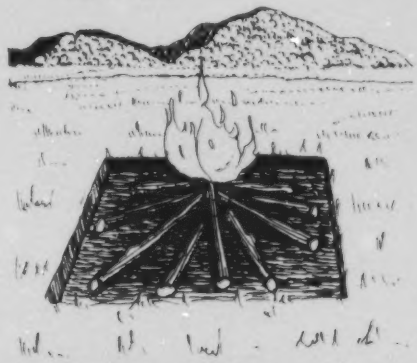
darkness. The number of backpackers in the party will have some influence as to the amount of time needed for evening preparations. If you allow sufficient time and energy to look carefully for a resilient campsite, you can make a better choice and have less impact on an area.

Setting up

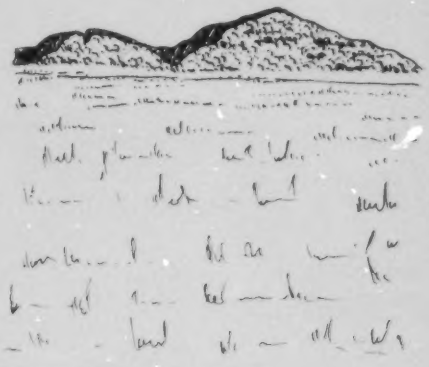
Duties or assignments should be decided upon before you stop so everyone knows what to do.

The cooking area should be set up with an area for stoves or a fire and an area for food to avoid congestion. Go without a campfire if you are in an area that shows no previous use. If you must build a fire, use an existing fire ring. If no fire ring is present, pick a site as free of vegetation as possible. Dig a shallow pit and build a small fire. Do not use stoves around the fire. Use only small pieces of dead, downed wood. Do not cut live wood. When finished, throw away extra wood, put out the fire, fill in the pit, and camouflage it with pine needles or other natural materials.

Dig a shallow pit.



Build a small fire.



Replace soil and restore site.

Your tent site should provide some privacy, be sheltered, occupy high ground in case it rains, and be level enough for comfortable sleeping. Clear the ground beneath your sleeping pad of sharp objects and debris, but otherwise do not disturb the area. Never trench a tent; never use boughs underneath a tent; never build rock walls as windbreaks.

Sanitation and water supply

Toilet spots should be located away from the campsite, water supply, or dry stream bed. If you are staying in a populated or often-used area, select a site away from camp and dig a hole 4 to 6 inches deep. Use toilet paper sparingly, then burn, bury, or carry it out. When you are finished, cover the hole, and tamp it lightly. If you are camping in a low-use area and your group is small, each person can dig a shallow spot, then cover it. In this manner, human waste will decompose quickly.

You should dig a hole to be used for dishwater, brushing teeth, and other such camp disposal needs. Make sure it is away from water supply, trail, or dry stream bed.

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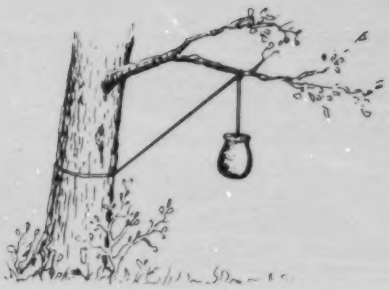
You will need a water supply. Do not drink any natural water without proper treatment. As clean as the area may look, as undisturbed as the area may seem, and as clear as the water might appear, the incident of pollution and illness is too great to ignore. Boil water for 20 minutes to kill all organisms. If you use chemical tablets, be sure they are fresh and begin timing *after* tables have dissolved and thoroughly mixed. If water is cold (less than 41 °F) or cloudy, double the dosage.

Use the following amounts per quart of water and let stand for at least 30 minutes:

Household bleach—4 drops
Halazone—5 tablets
Hydroperiodide—2 tablets
Tincture of iodine (2%)—10 drops

If you use a filter, make sure it has a pore size of less than two micrometers. Commercially available activated carbon or resin bed-type filters by themselves will not remove harmful organisms.

In some areas you will need to suspend your food from a tree at night to protect it from animals and to discourage their visiting your campsite. Keep your campsite clean so food particles don't attract animals.



You will need to protect food from wild animals in some areas.

Before you retire to bed, look around your site so if you are disturbed during the night you won't be too disoriented. Have your flashlight in the sleeping bag and your shoes, clothing, and canteen nearby. Sleep so your head is elevated and close doors and screens as needed.

Clean-up

All gear should be aired and dried before packing. Wash everything, including yourself, well away from your water supply, campsite, and the trail. Use biodegradable soap and allow it to filter and dispense in the soil. It's a good idea to dispose of dirty washing water by digging a hole and then relandscaping carefully. If a large hole is not needed, you can turn over a good-sized rock and use its cavity, then replace the rock.

Do not bury garbage.

Carry out *everything* you packed in. Do not bury garbage. If you have a campfire, some paper can be burned, but be careful not to leave behind a large residue of burned paper that's hard to disguise. It's usually better to carry it out. Erase any trace of a fire scar if you used an open fire. Do not leave a fire ring. Make sure your fire is out and scatter the ashes. In sandy areas bring in fresh sand, twigs, and fallen leaves to rehabilitate the area. If your tents have compressed the area, use a branch to rake the vegetation to a standing position. This will speed up the recovery of the site.

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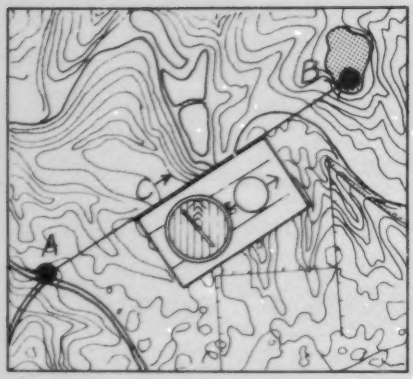
Preparation

Trip planning

A fragment of the reward for many backpackers is the excitement of planning the trip. Many novices never undertake another backpacking trip because of slipshod preparation. Once you have gone backpacking, you usually realize that organized planning is a must. This is true whether your group is small or involves a high school class, community group, or local club.

Designate a leader or that person who will have the final say. Especially in the outdoors, it's important to have someone who is in charge when a decision must be made quickly.

Make your plans well in advance—a month or more ahead. The larger the group, the more preparation time you should allow.



Plot your route using a map and compass.

WHERE, WHEN, AND HOW TO GO

Set a date for your trip, with an alternate date as a backup. Determine where you want to go and obtain maps for the area (see Backpacking Areas in Missouri, page 90). If it's your first trip, it's a good idea to plan the trip close to home in an area that is familiar to at least one person in the group, preferably the leader. The terrain should be moderate in difficulty. Plan for a time of year when hopefully the weather conditions will not be extreme (ice storms or heat waves).

Get together the supplies and equipment you and the group will need. Arrange for transportation. Plan menus and compile a food supply list. Establish an itinerary—it can be as formal or informal as you want. Find out the regulations and permits necessary for the area you'll be visiting.

Compile a roster with names, addresses, and phone numbers of the people making the trip. If you are dealing with minors, obtain parental permission slips for each student. Ask for medical information on your students so you can be aware of any possible problems, such as a student who is allergic to bee stings or sensitive to poison ivy.

Make copies of your plan and itinerary and leave them with responsible individuals or a wilderness ranger. Make sure someone knows when you plan to return. Failure to return at the appropriate time will alert that person to a possible emergency or problem.

Take only what is absolutely needed! You can determine this by reading, talking to experienced packers and guides, and sharing information with any group leaders.

You should consider these categories:

1. water and food
2. clothing
3. shelter
4. sleeping gear

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Check all equipment before you pack it.

5. survival—map and compass, matches, flashlight, knife, whistle
6. stove and cooking gear
7. personal gear
8. group gear
9. special equipment
10. first-aid kit

Personal checklists are an invaluable aid in determining what fills the pack. After deciding what you think you need, reduce the amount of items. Most beginning backpackers tend to take too much. They think in terms of urban living, eating, and interacting. Your checklist will be changed through trial and error. When you return from a trip, examine the checklist as you unload equipment and supplies and make notes to help you on the next trip.

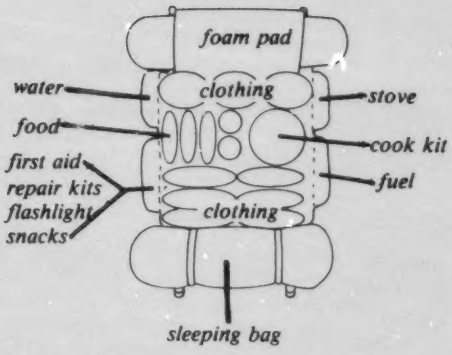
How to pack

Package and label food so it can be selected easily. Group clothing by use and weather. Gear such as shelters, stoves, utensils, and water will be divided among everyone in the group.

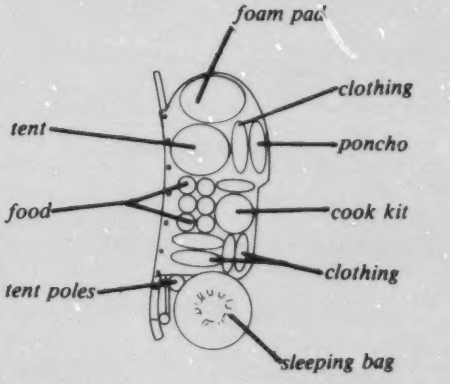
The weight of the pack will vary. Weather, length of time on the trail, types of food, and the weight of individual equipment are factors that affect your total weight.

While there is no ideal formula for pack weight, research has found that at a speed of 3 miles per hour, the most efficient backpack load equals about 20 to 25 percent of body weight. Whatever the amount, the trip should not be viewed as a weight-lifting experience.

Techniques in packing can vary, but usually they follow a common pattern. Refer to Appendix 3, page 100, for a sample illustration of packing the pack.



Controlling the distribution of weight means keeping heavy objects and weight near the top of the pack and close to your back. This keeps the center of gravity on a line through the trunk, hips, and legs and minimizes pull on the shoulders. Separate horizontal and vertical compartments help control weight distribution. Tough plastic sacks can be used to store gear, keep it separated, and readily accessible. Items most used should be put in last. Water canteen or bottle, fuel bottle, rain gear, first aid and repair kits, flashlight, medications, and trail snacks can go in the side pockets. Small items can be stored throughout the pack or in your pockets. Least used clothing, stove, utensils, and food should fill the upper main compartment so the weight is near the top. Pack the tent under the top flap and attach the sleeping bag and roll at the bottom of a three-quarter pack frame. Always use the same arrangement of packing so items can be found easily.



Two backpackers should divide equipment equally. With a group, you will need to divide all the equipment among the members so the load is shared as equally as possible. Special equipment such as winter gear, ice axe, snow shoes or skis,

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fishing rod, long barreled firearm, bow and arrows, ropes, and some photography equipment can be hung from the frame.

MOUNTING AND UNMOUNTING THE PACK

Mounting and unmounting the pack can be exhausting when you do it many times a day in the course of a trip. Everyone should experiment to find the best method.

One of the easiest ways to load is to have a fellow packer hoist the pack frame from the backside while you slip arms through the shoulder straps, then buckle the belt. The same procedure can be used to unload the pack.

Another method is to use a fallen tree, ledge, or rock formation as a stand, then slip arms through the straps. A stand, if available, also helps make unloading the pack easier.

Still another method is to place the pack on the ground, sit down with back to pack, slip arms through straps, and buckle the belt. From this position, however, it's sometimes hard to get up, especially if your pack is large and heavy.

Most backpackers master the technique of hoisting the pack to their knee by using one hand on shoulder strap and one hand on top crossbar. After steadying the pack, one arm is placed through the appropriate strap and the pack hoisted high enough for the other arm and shoulder to go through the other strap. The procedure is reversed to unmount the pack.

Conditioning

Backpacking is a physical activity and depending on conditions, can be very vigorous. It's important to be in condition and to not let yourself get too tired. Accidents are more prone to occur and decisions become more difficult to make when a person is tired.

MEDICAL EXAMINATION

It's a good idea if you are contemplating a backpacking experience to have a thorough physical examination. The exam should focus on possible heart, lung, and blood vessel

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problems, and any foot, leg, hip, or back defects or injuries. If you are diabetic or taking medication, be sure to get your doctor's advice on how much physical exertion you should undertake.

If you have passed a physical examination in the past year, you can begin an exercise program. Those who are older should check with their personal physician before beginning a program.

Note to instructor: Adapt training programs to the needs of individual students and the resources available. See Individual Conditioning Logbook, Appendix 4.

GETTING IN SHAPE

The best way to train for walking is by walking—with a load on your back. You should train through a gradual program of conditioning for at least six weeks prior to your trip. How you train will depend on age, general body conditions, and lifestyle. Consult a physician before you start.

One approach to training uses the "Hard-Easy Principle" which alternates walking several fast miles one day with two slow miles the next and resting at least one day on the weekends. This activity can be combined with jogging, running up hill occasionally, and lifting weights or heavy objects to improve upper torso and limb strength. As the condition of your body improves, increase the load you carry from 5 to 30 pounds. Also walk steeper terrain.

If you want to train more gradually, start with short walks in the neighborhood. Measure your distance and continue to increase it (high school or college tracks are convenient for this).

After a few days of walking, begin jogging to increase the demand on your body. As your body responds, you can increase the distance and the intensity and interval of walking, jogging, and sprinting/running. If you include running in your conditioning exercises, you should not get blisters. Activities such as swimming, racquetball, and tennis can be used in the conditioning process.

In simple terms, cardiovascular fitness refers to the building of strength and endurance to the heart, lungs, and oxygen-carrying system of the human body. Prospective backpackers must be aware of the conditions of their feet, legs, knees, hips, and backs. Proper treatment and adequate rest are important. Gradual exposure to the sun also is important to prevent sunburns.

A backpacking experience can be spoiled by not being in responsible condition. In extreme cases, safety, and even survival, may depend on your ability to acclimate your body to the physical, mental, and climatic conditions on the trail.

PACING

How you walk on the trail is important to using energy most efficiently. Try to establish an easy, consistent rhythm to your walking. Avoid abrupt lunges, spurts of speeds, or other maneuvers that interrupt an easy, effortless pace. Speed actually wastes energy.

Practice rhythmic breathing, whereby you adjust your pace to your breathing, so you breathe evenly. This conserves energy. On level ground you might take three steps while exhaling. If the trail steepens, breathe the same but take only two steps while inhaling a breath and two while exhaling. Adjust as necessary. In this way, your heartbeat remains constant but you slow down or speed up according to the number of steps you take with each breath.

Keep your toes pointed straight. Let your arms swing naturally to maintain your equilibrium. Take breaks about once every hour (depending on group and terrain) and refuel your body with snacks and water. If the trail becomes steep and rugged, slow down, take shorter steps, and think about something pleasant. Relax and enjoy your experience.

MENTAL CONDITIONING

Under extreme or stressful conditions, behavior can change unpredictably unless people are prepared. It's important to teach students how to get along with one another in the wild outdoors. They must learn the importance of looking out for everyone's safety and personal comfort.

Paul Petzoldt discusses "expedition behavior" in *The Wilderness Handbook* and provides tips to leaders:

1. Tentmates represent the closest relationship on an outing. The best balance usually is maintained if you limit two persons to a tent. Campers are happier if they choose their own tentmates; however, close friends should be separated. Changes should be made if conflicts develop. Each person should respect another person's privacy when sharing a tent and always leave that person's belongings alone.

2. Keep a neat camp. Personal hygiene also is important.

3. Distribute food rations to a group of two or four, rather than to each person.

4. Try to be conscious of offensive habits.

5. Persevere. Backing out or becoming uncooperative is unacceptable, even if things don't work out as you had hoped.

6. Remember that pre-planning is important and individuals should know what they are getting into. Establish goals and standards for the trip and let every member know beforehand.

For more information, see Paul Petzoldt, *The Wilderness Handbook* (New York: W.W. Norton & Company, Inc., 1974), pp. 127-143.

REST

Getting a good night's sleep and proper rest on a backpacking trip is extremely important to assure a safe and enjoyable experience. Most people can handle about anything if they are alert and well rested.

On the trail, it's important to take breaks at regular intervals—5 minutes every half hour or 10 minutes every hour. If it is cold, take time to fix a hot drink and eat a snack.

At night, make sure you are sleeping on level ground and use a pad underneath your bag. The thicker your pad, the more cushion you'll have (or invest in a ThermaRest).

Important Considerations

Weather

Weather and weather changes can play havoc with your trip and your morale. In extreme cases, weather conditions can cause injury or death.

Temperatures may range from well over 100 degrees to below 0. The expected temperatures help determine the food, equipment, and arrangements for a trip. Listen to weather reports and forecasts by the U.S. Weather Service. If you have a severe weather forecast, you will probably want to postpone the trip unless everyone is well prepared for such weather.

WINTER CAMPING

Cold weather and snow do not need to keep you inside. In fact, some people prefer to camp in winter because they have more space, silence, and solitude. There is nothing like fresh-fallen snow to erase the marks of civilization.

Winter camping, however, requires careful planning and the right clothing and equipment. Layer your clothes so you can add and subtract as you heat up or cool down. Wear just enough so you don't feel cold. Choose fabrics such as wool and fiberpile that will keep you warm even when damp. In winter, windproof and waterproof garments are essential.

In addition to warmer clothing, you will need more fuel and food. Make sure your stove works at low temperatures. One-pot meals are usually the easiest to prepare in cold weather. Don't skimp on calories. This is not the time to diet. You need extra calories to keep warm. For strenuous winter activities you should eat 4,500 calories a day. In snow conditions, about half your daily intake should be carbohydrates, with the other half equally divided between proteins and fats.

To keep warm you will also need a good sleeping bag (for most campers a mummy bag with 2 pounds of goose down or 4 pounds of synthetic fill will do), an insulation pad beneath your bag, and a means of shelter such as a winter tent or a snow cave.

WARM WEATHER CAMPING

To remain cool, you should wear lighter clothing, stop

frequently to rest, drink liquids often, and travel whenever possible in the shade.

WET WEATHER

Wet weather is more of a problem when you stop to set up camp and prepare food. Good rain gear should keep you and your equipment dry.

Experienced backpackers develop knowledge about the weather to supplement the forecasts. They learn to identify clouds and cloud formations which precede the movement of weather fronts into an area.

Thunderstorms with heavy rain, accompanied by lightning and flash-flooding, are common in the hills and mountains. If you are caught in such a storm, avoid open and exposed areas and move to shelter. Uniform treelines and deep caves offer the best protection. Avoid solitary and high trees as well as shallow caves and ledges. Disperse your group as much as possible.

Injury / Illness

You should be aware of and watch for several possible illnesses or injuries that might occur on a backpacking trip. For safety reasons, it's not a good idea to travel alone.

People struck by lightning are not always killed. Arrested breathing and heart beat can be restored by resuscitation, then burns or any other injuries can be treated.

A sunburn can range from uncomfortable to dehabilitating. With proper precautions, no one should get burned. Prior exposure to the sun, adequate clothing, and application of sunscreen lotions to exposed areas should reduce chances of sunburn.

Dehydration can sometimes be another problem. The body's ability to maintain its normal temperature is greatly taxed during strenuous exercise. Body fluids must be replaced as rapidly as they are lost. Drink water or other liquids at regular intervals.

Blisters are a common problem of backpackers. They can be prevented by making sure your boots fit properly and are well broken in and by taking care of your feet on the trail. If you feel a blister starting, stop immediately and apply moleskin to the area that's being rubbed. Do not put moleskin directly on a blister, rather put it around the area.

Constant exposure to the sun without sunglasses can be hard on the eyes. Protect your eyes with sunglasses or a hat with a wide brim. Wash them out or use eye drops if they become tired or irritated.

Heat stroke, heat exhaustion, hypothermia, and frostbite are potentially dangerous problems on the trail. Remember too that the weather does not have to be severe to create these situations. Being prepared is the key.

Ankle sprains, as well as knee and back strains, are other common injuries. Properly fitted boots and backpacks reduce these problems. Previous conditioning can also help

Sunglasses or goggles protect your eyes.

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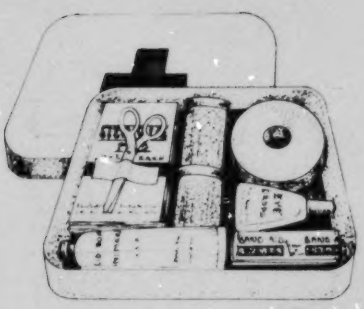

Always carry a first aid kit.

prevent them. When traveling rough terrain, be especially careful. Climbing and jumping with a heavy pack can be hard on joints. If you have a problem, use an elastic bandage for extra support and reduce your load.

Rest stops are important for group morale. Leaders should schedule 10-minute breaks every hour, more often if the terrain is difficult and members are tired. Take a break for a snack, brief rest, conversation, and check on your members.

FIRST AID

Backpackers should have some knowledge of first aid before embarking on a trip. A first aid kit (including first aid booklet) should be a regular equipment item. Items within a kit will vary from person to person. Large groups or expedition travelers need to carry more sophisticated kits.

Note to instructor: A well-prepared leader will have good training in first aid, a comprehensive first aid manual, and a medical history on each student. You may also want to carry some over-the-counter medicines such as a decongestant, a pain reliever, an antihistamine, something to induce vomiting, a first aid cream, and a diarrhea medicine.

The following first aid supplies should be included:

1. adhesive tape
2. band-aids
3. gauze pads or roll
4. elastic bandage
5. safety pins
6. scissors
7. soap
8. aspirin
9. swabs
10. moleskin
11. eye drops
12. needle
13. antacid tablets
14. personal medicines
15. poison ivy/sunburn spray
16. miscellaneous drugs/doctor prescriptions for individuals in the group
17. insect repellent
18. antiseptic/antibiotic ointment

Wildlife

The wilderness is habitat for many wild animals. It is their natural home and we are the intruders.

Ticks, bees, mosquitoes, flies, spiders, and scorpions are prevalent in certain areas during certain periods of the year. Proper precautions such as clothing, sleeping nets, and repellent will assist in minimizing bites. Use common sense in walking, turning rocks, climbing, or sitting in areas that might be infested. If bitten, apply first aid immediately.

Copperhead

Few people in Missouri suffer venomous snakebites, despite the fact that there are five venomous species and at least one of them—the copperhead—is commonly encountered. Most bites occur when persons are trying to kill or handle the snakes. According to the National Safety Council, about 8,000 persons are bitten by venomous snakes each year in the United States. Perhaps a dozen die, which

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amounts to a fraction of one percent. By comparison, 94 people died in one year as a result of being struck by lightning.

Encounters with venomous snakes can be prevented if you follow these simple rules:

1. Stay away from areas where there may be a concentration of venomous snakes, such as swamps, marshes, and bluffs.
2. Wear protective footwear in areas where there are likely to be snakes. Thick leather or rubber boots or hightop hiking shoes will protect feet, ankles, and lower legs.
3. Never place your hands under rocks or logs; do not step over rocks or logs. Step on them first, then over.
4. Step lively when hiking. Look the ground over, particularly around large rocks or logs when you stop to stand or sit.
5. Avoid any snake you cannot identify.

In the event of a venomous snakebite, seek medical attention immediately. For current information on snakebite first aid, contact your nearest American Red Cross office.

Do not keep food in your tent or leave it sitting around your campsite. This can attract raccoons, skunks, opossums, and other wild animals. Hang your food from a tree at night or during the day when you leave the campsite.

Your chances of ever encountering a bear in Missouri are slim even though black bears have been sighted, particularly in southern Missouri. They are not aggressive like their grizzly cousins, however, and no human injury has been recorded in Arkansas or Missouri. Chances are that a bear will avoid you before you ever have to worry about avoiding it.

Mammals may be rabid. Do not handle or pet them or encourage them to eat. If you are bitten, wash the bite immediately with soap and water, then see a physician for further treatment. All backpackers should be immunized for tetanus.

Poison ivy

Plants

Poisonous plants, along with insect bites, constitute some of the greatest discomfort to backpackers. Poison ivy is a widespread plant that can cause a miserable itching for several days.

If you are backpacking on glades or balds in south central or southeast Missouri, you may also run into poison oak. Be sure you know how to identify both poison ivy and poison oak and avoid contact with the plants. All parts of the plants can cause a skin irritation. If you burn wood that has the vines attached, you can also get a rash from the smoke.

If you do come in contact with either of these plants, wash exposed skin with soap and water within 15 to 30 minutes. If you start to itch, apply one of the lotions made for relief. Some people have more serious reactions. If blisters or severe swelling occur, see a doctor.

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Do not eat wild plants unless you are absolutely sure what they are and know they are safe. Many are toxic and can cause severe sickness or death.

Avoiding emergencies

Note to instructor: For more information, consult the Environmentally Emergency Preparedness *module (to be published).*

With the proper preparations and training, you should not find yourself in a "survival" situation. Inexperience and poor preparation are the most common factors contributing to emergencies on the trail. And what might seem an emergency to one group may be merely an inconvenience to a more experienced group.

Being able to cope with the unexpected will help you avoid panic. Prepare on the following subjects before your trip: safety, first aid, and map and compass. Anticipate unusual or extreme conditions you might encounter.

Some basic factors to consider:

1. Never backpack alone.
2. Leave travel plans with proper individuals.
3. Know your abilities and limitations.
4. Have the proper clothing and equipment. Check equipment to make sure it works properly.
5. Be knowledgeable of the area. Take topographic maps and a compass.
6. Don't panic. Use common sense. Control fear and depression.

The most common emergency is getting lost. You can avoid this by being familiar with the area, aware of landmarks, and by having a map with you. In most cases you would be within a few hours walking distance of civilization.

Other potentially dangerous conditions you want to avoid are hypothermia, frostbite, hyperthermia, and heat injuries such as heat cramps, heat exhaustion, and heat stroke. These are covered in detail in the *Environmental Emergency Preparedness* module (to be published in the Outdoor Living Skills Series).

Knowledge and practice bolster confidence. Confidence, tempered with common sense, can get you through an unavoidable emergency. Gain the knowledge, practice the skills, and keep your head!

Where to go

Missouri rivals many states for beautiful wilderness in which to backpack. You can choose from a wide variety of natural wonders.

Books

Two books will be particularly helpful when planning a trip:

Missouri Hiking Trails by Raymond Gass—Available from the Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102.

Hiking and Backpacking in Missouri by Fred A. Lafser, Jr.—Available by writing Fred Lafser, 212 Madison, Jefferson City, MO 65101.

Organizations

Numerous organizations can give you tips on places to visit. Check for a local chapter of the Sierra Club, Audubon Society, Youth Hostel Association, or ask at a local outfitters or outdoor equipment store. The Missouri Trails Association, P.O. Box 9958, Kansas City, MO 64134, has information on trails in Missouri and will welcome your membership.

Contact your district forester or conservation agent. They are knowledgeable of the area in their assigned regions. Some of the public land owned by the Conservation Department provides excellent places to backpack.

When completed, the Ozark Trail will wind 500 miles through rugged terrain in Missouri and Arkansas. Part of the trail is open in both states and several state and federal organizations, as well as volunteers, are working toward its completion. For more information, write: Ozark Trail Coordinator, Missouri Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102. For the Arkansas Ozark Trail, write: Arkansas Trails Council, One Capitol Mall, Little Rock, AR 72201.

If you plan to backpack outside Missouri, check with the U.S. Forest Service and the National Park Service for trail directories for the areas you'll be visiting.

Sources for maps

TOPOGRAPHIC MAPS

To order topographic maps, first determine which maps are needed by consulting an index map of the state in question. Index maps of all states are available free from:

National Cartographic Information Center
507 National Center
Reston, Virginia 22092

Index maps of Missouri are available from:
United States Geological Survey (USGS)
National Mapping Division
1400 Independence Road
Rolla, Missouri 65401
or
Missouri Department of Natural Resources
Maps and Publications
P.O. Box 250
Rolla, Missouri 65401
314/364-1752

Once the titles of the necessary topographic maps have been obtained from the index map, the topographic maps may be ordered. For topographic maps of areas in Missouri, write the USGS office in Rolla or the Department of Natural Resources in Rolla (addresses above). For topographic maps of areas outside Missouri, use the following addresses.

For areas east of the Mississippi:

Branch of Distribution
United States Geological Survey (USGS)
1200 South Eads Street
Arlington, Virginia 22202

For areas west of the Mississippi:

Branch of Distribution
United States Geological Survey (USGS)
P.O. Box 25286 Federal Center
Denver, Colorado 80225

For Canada:

Map Distribution Office
Department of Mines and Technical Surveys
Ottawa, Ontario, Canada

HIGHWAY MAPS

Many commercial establishments, such as filling stations, sell highway maps. You can also order them from:

Missouri State Highway & Transportation Commission
P.O. Box 270
Jefferson City, Missouri 65102

County highway maps provide the greatest detail. You can purchase them at any county clerk's office in the state.

NATIONAL FOREST MAPS

Write the forest supervisor at:

Mark Twain National Forest
Box 937
Rolla, Missouri 65401

or contact district ranger offices at Fredricktown, Poplar Bluff, Centerville, Salem, Potosi, Houston, Rolla, Fulton, Ava, Cassville, Doniphan, Van Buren, Willow Springs, and Winona.

NATIONAL PARK SERVICE MAPS

Write:
Ozark National Scenic Riverways
P.O. Box 448
Van Buren, Missouri 63965

MISSOURI STATE PARK TRAIL MAPS

Write:
Missouri Department of Natural Resources
ATTN: Information Center
P.O. Box 176
Jefferson City, Missouri 65102

or contact specific state park offices for their park maps.

MISSOURI DEPARTMENT OF CONSERVATION MAPS

For an "All Outdoors" map, write:
Missouri Department of Conservation
P.O. Box 180
Jefferson City, Missouri 65102

or contact one of the regional offices.

OZARK TRAIL MAPS

Write the Department of Natural Resources, Box 176, Jefferson City, MO 65102, or the Department of Conservation, Box 180, Jefferson City, Missouri 65102.

The following lesson plans are offered as a suggested and field-tested means of teaching this subject material. Times are estimated for 50-minute class periods; however, the time needed for each lesson may vary depending upon the teacher and class. Also, the time required for each unit may be lengthened if some of the optional activities are included. Pages in the appendix may be reproduced for distribution to class members.

ADAPTABILITY TO THE DEVELOPMENTALLY DISABLED STUDENTS

Some of the objectives of backpacking can be achieved by the disabled. A program will need to be adapted to the particular handicap or need of the student. The physically handicapped often gain satisfying and successful experiences if the goals and trails are modified to their capabilities. The mentally disabled also can gain rewarding experiences by proper planning and leadership.

Safety precautions are particularly important when working with a disabled participant. It will be necessary to provide more leadership and supervisory personnel. If you have disabled students on a trip, assign another adult or responsible student to be a partner.

If you have students with impaired vision, use a rope to help guide them along the trail. Keep the pace slow and point out as you go what you are seeing. Have them tell what their senses are detecting, such as smells or sounds. This can heighten everyone's awareness.

Some areas have paved nature trails if you want a day's outing for students in wheelchairs.

The Department of Conservation will publish a module in 1985 entitled *Outdoor Skills for Special Populations.* It will include more information for adapting outdoor activities to the developmentally disabled.

No. 1

Title:	Introduction
Method:	Lecture, class activity and discussion, film
Time:	50-minute period
Purpose:	To introduce content material and objectives; to give a historical background of backpacking; to acquaint students with the scope and variety of experiences possible; to stimulate interest
Instructional Aids:	Projector, screen, chalkboard, film: "Backpacking" (15 minutes)
Facilities:	Classroom that can be darkened for film

Outline:

I. Introduction: An overview
   A. Activity—"Fantasy Trip" (10 minutes)

(Class activity)

FANTASY TRIP

In order to introduce students to backpacking and the enjoyment of backpacking, take them on a trip without leaving the classroom. They may understand the reasons for backpacking better if they can imagine living away from civilization with a pack as their means of getting there. Ask students to close their eyes and imagine nature as you describe the following scene or a scene of your own creation.

Note to instructor: An alternative introduction to the Fantasy Trip is to show the 6.6 minute S.P.O.R.T. Ethics slide show with music (available from the Department of Conservation) or any other slides that depict the beauty of the state and opportunities for backpacking.

Example:

"The cool breeze is blowing through your hair. Leaves are rustling above you. The tree at your side is a big oak—four times as big around as you are. Lean against the trunk and look up through its limbs. There's a turquoise sky behind the moving leaves. The bark of the tree is rough against your cheek. Take a deep breath. Does the air smell like green leaves and mushrooms?

"Walk on through the woods. Sprouts and twigs are slapping against your legs. Leaves and sticks are crunching under your feet. Something moves ahead of you. Can you see it? It's a rabbit sitting quietly in the grass looking at you. Don't move. There it goes.

"The woods are pretty dark, but you notice some violets growing beside a decaying tree stump. Stop and smell the violets if you want; but watch out for the bee that's buzzing around the plant. The grass tickles your palms as you go in for a closer look. What color is the center of the violet?

"You are coming to a small clearing in the woods. The sky has a few clouds in it—thin wispy ones that look like a horse's tail. Can you feel the warmth of the afternoon sun as it shines on your back? A bluebird just flew by looking for

bugs in the grass, his flight in small sweeps. Is the bird a bright blue male or a dusty female?

"Entering the woods again, you are beginning to walk downhill now. Water is running. Can you hear it? A soft whispering noise is made as it glides over mossy rocks and past gravel bars. There must be a waterfall near too. Hear the water roar?

"You're getting closer to the stream. There are ferns standing in big clumps at your feet. Be careful not to crush their tender stems. Notice how lacey their leaves are. Have you ever seen anything like them before?

"The air is getting damp and cooler. A squirrel is chattering in a tree behind you. Can you locate it? You just disturbed a butterfly that had lit in the ferns; with its black and yellow wings, it flies toward the water.

"Walk down to the edge of the stream; watch your step or you'll get your feet wet. There is a dull red rock by the edge of the water. Pick it up and place it in the water. See what a crimson color it turns when wet? Now feel the cool water. There are other rocks with moss on them. Touch the moss. Have you ever felt green velvet before? There are deer tracks beside your foot. They look like two half-moons pressed into the sand.

"Is there any litter in the stream or on the forest floor? Are there other signs that people or livestock have been here before? Did you see any human footprints? Is the water clear? Would you consider splashing it on your face? Are the only trails made by animals? Do you hear any chainsaws or machinery? No traffic either?

"Do you want to stay here? There are many areas like this—away from civilization and rarely disturbed by people, but the only way you can see them is to backpack into the area, leaving no trace that a human has passed through."

(Lecture)

B. Goal—Tell students the goal of this course is to enable them to enjoy hiking and backpacking in a prepared, safe, and responsible manner.

C. Objectives

The student should be able to do the following upon completion of the course.

1. Describe how people through history have relied on traveling by foot and carrying their necessities for life.
2. List five reasons why people backpack.
3. Describe a program of conditioning.
4. Describe how to select a campsite, giving at least five considerations influencing selection.
5. Discuss the technique for assuring a proper fit with boots.
6. Describe at least three things you can do to keep your feet warm.
7. Explain why it's best to wear layers of clothes in cold weather.

8. List the advantages of wool.
9. Name and describe two sleeping bag designs. Discuss the advantages of each.
10. List five factors you should consider when selecting a tent.
11. Pitch and strike a two-person tent.
12. Demonstrate how to pack a backpack by showing proper assembly of gear and equipment, weight distribution, and putting on and taking off the pack.
13. Demonstrate how to light a backpack stove, then boil a cup of water.
14. Describe proper procedure for the following:
    a. How to dispose of garbage
    b. How to build a fire
    c. How to dig a latrine
    d. How to clean up a campsite
15. List five things you can do to help avoid an emergency on the trail.
16. Predict some of the problems you might have if you went backpacking with boots and a backpack that didn't fit properly.
17. Write a short paragraph describing how your plans for a backpacking trip would be affected if there were no public lands for backpacking and camping.
18. Make a list of problems created by a lack of outdoor ethics and propose at least one solution for each.

D. Content—Identify for the class the main topics that will be included in this unit. The date of the culminating backpacking trip should be announced (if an actual practicum is planned).
   1. Ethics
      a. Trail manners
      b. Human impact
   2. Equipment
      a. Boots
      b. Socks
      c. Shoes
      d. Clothing
      e. Backpacks
      f. Bed gear
      g. Shelter
      h. Essential equipment
      i. Optional equipment
   3. Cooking
      a. Food
      b. Stoves
      c. Cooking equipment
   4. Navigation
      a. Before the trip
      b. Alternate methods

c. Procedures if lost

5. Campsite
   a. Selection
   b. Setting up
   c. Sanitation, water supply
   d. Clean up
6. Preparation
   a. Trip planning
   b. How to pack
   c. Conditioning
7. Important considerations
   a. Weather
   b. Injury, illness
   c. Wildlife
   d. Avoiding emergencies
   e. Where to go
   f. Sources for maps
8. Material available to students in appendix
9. Bibliography as a resource guide for the student

II. History of Backpacking

A. Early man

First backpacker because he carried what he needed to survive when he went out hunting.

B. Agrarian man
   1. Farmed as well as hunted and fished.
   2. Used domestic animals for transporting supplies and equipment.
   3. Still had to carry possessions on foot.

C. Modern man
   1. Backpacks more for recreation.
   2. Interest inherited from ancestors.
   3. All people walk. In an average lifetime we walk 115,000 miles—or 5 times around the earth.

III. Film "Backpacking" (15 minutes)

Note to instructor: The film "Backpacking" is available from the Department of Conservation. Contact your outdoor skills education specialist to borrow a copy.

A. Introduce film by asking students to be prepared to answer the following questions at the end of the film.
   1. What type of backpack is most popular and easiest to carry?
   2. What should you consider first when gathering your gear?
   3. Why should you wear layers of clothing?
   4. What should you look for in a tent?
   5. What are the characteristics of a good sleeping bag?
   6. What kind of breakfast should you eat?
   7. Where do you carry your heaviest items in a backpack?
   8. Where do you carry...fuel, water, tent, sleeping bag?
   9. Where do you get maps?

10. What is one thing you should do before you leave on a backpacking trip?

B. Show film.

C. Discuss film and have students answer questions.

IV. Why backpack?

A. Questions:

Why do people want to backpack? Why do they start? Why do they continue to go again and again?

B. Answers:

1. Americans have a heritage from the Pilgrims to the traders and trappers who explored the West, steeped in outdoor experiences, skills, and lore.
2. Modern Americans enjoy recreation in a natural environment.
3. Some want to experience the impact of nature on human life.
4. The outdoors is a great place for learning.
5. The outdoors is a playground for fun and enjoyment.
6. Friends can backpack together.
7. Some people are members of groups and organizations that promote hiking and packing.
8. Students take classes that introduce them to the pleasures and rewards of the outdoors.
9. Some people seek vigorous exercise, physical exertion, and fitness.
10. Others look for peace of mind, serenity, and meditation.
11. The difficulty of the challenge and the exhilaration of victory is reward for a few.
12. Those who enjoy hunting, fishing, rappeling, spelunking, photography, or nature crafts use backpacking to pursue their sport or hobby.
13. Groups enjoy new friendships, improved communications and interactions.
14. By being in the midst of an environment so proportionately large, individuals find out more about themselves.
15. Many people enjoy the awesome beauty of a pristine scene they cannot find near civilization.

V. What does Missouri offer?

A. Hiking opportunities

1. Missouri has about 2.8 million acres of public recreation lands owned and operated by state and federal agencies.
2. Each agency provides hiking trails for the public.
3. Ozark Trail is a joint team effort of all agencies, plus some private owners. When completed, it will meander 300 miles through the heart of Missouri's vacationland.

B. Forest managment

1. Forests are managed for several purposes:
   a. To provide a source of wood fiber for the consumer industry.
   b. To improve habitat for wildlife.
   c. To keep pollutants and eroding soils from entering streams and lakes.
2. Foresters try to manage areas so hikers still enjoy a pristine environment and have a chance to see more wildlife.

VI. Optional Activities

A. Guest speaker

Select a private citizen, fellow teacher, Boy or Girl Scout leader, or Sierra Club member who has gone backpacking and who can share positive experiences with the class.

B. Slide presentation

Many of the speakers from the sources mentioned will have slides to use in conjunction with their talk, or as a separate activity.

Note to instructor: To obtain a copy of the filmstrip, write: Jim Mentis; Associate Professor; Health, P.E., and Recreation; Southwest Missouri State University; Springfield, MO 65804.

C. Filmstrip—"Backpacking" (34 minutes)

D. Ask class members if any of them are photographers. Have them take photos on the backpacking trip, prepare a slide show and present it to the class as a culminating activity.

No. 2

Title: Human Impact and Outdoor Ethics

Method: This unit can be developed effectively by using guest lecturers such as conservation agents, foresters, naturalists, or trail interpreters who can give an actual account of the human impact on the environment and the part the responsible backpacker can play; lecture; class discussion; slides; films.

Time: Three 50-minute periods

Purpose: To create an awareness of the impact people can have on an area; to teach proper individual and group behavior on the trail; to inform students of their responsibility to help take care of the environment and to show respect for other people and their property

Instructional Aids: Film: "Ecosystems—Mountain, Forest, and Meadow" (21 minutes); S.P.O.R.T. program materials; slide projector; film projector; screen

Facilities: Classroom that can be darkened for film and slides

Outline:

(Film)

Note to instructor: To obtain a copy of the film, write: Jim Mentis; Department of Health, P.E., and Recreation; SMSU; Springfield, MO 65804.

(Lecture)

I. Film: "Ecosystems—Mountain, Forest, and Meadow"
Introduce film by asking students to be prepared to answer the following questions at the end of the film.
   A. What evidence of pollution by people did you see?
   B. What environmental areas showed evidence of the physical impact of people's presence?
   C. What scenes shown in this film would make a good campsite? Why?

II. Human Impact on the Environment
Make the least impact possible on the environment.
   A. Bury human waste so it can decompose.
   B. Pack out all garbage.
   C. Wash dishes or clothing away from any water source and use non-detergent, biodegradable soap.
   D. Loud noises from voices or radios have no place on the trail or at the campsite.
   E. Never pick flowers, cut live trees, or disturb wildlife.
   F. Stay on trails to cut down on erosion.
   G. Do not trench tents, build unauthorized fires or leave fire scars, carve on trees, or deface property in any way.
   H. Do leave an area in as good or better a condition as you found it.
   I. Travel in small groups of 10 or less.

III. Trail Members
   A. Backpackers need to develop an awareness, an understanding, and an appreciation of the outdoors.
      1. The ecological system as we know it now will not survive if we don't maintain a balance between people and nature.
      2. We have a responsibility as stewards of the land.
      3. We owe it to future generations to manage and conserve our natural resources.
   B. Trail manners dictate that a backpacker develop consideration for fellow packers. Problems occur most where people tend to concentrate. A few simple rules should be followed.
      1. Allow a descending packer to pass first.
      2. Step aside for a fellow packer who is walking faster.
      3. Always step off the trail and out of the way of horses.
      4. Do not damage fences.
      5. Leave gates as you found them—open or closed.
      6. Do not change or remove any trail signs.

(Lecture, class discussion)

IV. Outdoor Ethics—Becoming a S.P.O.R.T.
   A. Introduce the S.P.O.R.T. program.
   B. Relate discussions and activities to backpacking and camping.
   C. Using the S.P.O.R.T. outdoor ethics class manual, teach the course in one or two class periods.

Materials needed:
S.P.O.R.T. outdoor ethics class manual and activities booklet, slide show, film, handouts (all available from the Missouri Department of Conservation).

V. Optional Activities

A. Select a schoolground or park area for an exercise in observing people's impact on the environment. Divide the class into small groups and designate an area for each group to scout. Give each group a list of items to find or check off. (Suggested items on list: cans, bottles, plastic containers, paper, bottle tops and tabs, cigarette butts, cardboard, wrappers, foil, a fire scar, broken plants, trampled vegetation, bare or eroded ground, burned trees or grass, bits of cloth, garbage or food waste, discarded trash items.) Set a time limit. The first group to find all the items on their list or the group to have found the most items at the end of the time is the winner. Discuss the activity and what effect people can have on the environment.

B. There are several class projects in the booklet "How to be a good S.P.O.R.T." that will reinforce good outdoor manners. If time permits, have students participate in a scavenger hunt, build a trash sculpture, role play a situation, or form a S.P.O.R.T. club. Have some students build a safe campfire (see page 40), then extinguish it, and cover up any signs of the fire. Ask other students to try to find where the fire was built.

C. Ask students to create a magazine advertisement which would promote the idea of practicing good outdoor manners.

No. 3

Title:	Equipment
Method:	Lecture, demonstration, field exercise, discussion
Time:	Three 50-minute periods. (1) Lecture and demonstration: footwear, clothing; (2) Lecture and demonstration: packs, bed gear, shelter, other equipment; (3) Field exercise in pitching and striking a tent.
Purpose:	To acquaint students with the wide range of backpack equipment and how to select what is appropriate for them; to teach students how to pitch and strike a tent
Instructional Aids:	Examples of equipment, Trip Checklist (Appendix 2)
Facilities:	Classroom, outdoors

Outline:

(Lecture, demonstration)

Materials needed:
Samples of equipment (obtain from individuals, local outfitters, youth organizations such as the Boy Scouts or Girl Scouts), Trip Checklist (Appendix 2).

I. Backpacking Equipment
A. Footwear
1. Boots—When carrying a weighted pack, much stress is placed on the packers' feet. It is essential to select a suitable boot.
a. Types
(1) Boots are generally classified by their type of use—trail, hiking, climbing, or mountaineering.
(2) A hiking boot is adequate for the average backpacker.
(3) Lightweight boots are suitable for much of the terrain in Missouri.
b. Fit, weight
(1) Try not to order boots. You should be able to examine and wear them.
(2) Wear the socks you plan to hike in.
(3) Shop in the afternoon so your foot has expanded.
(4) Flex your toes and force your feet forward in the boot—you should be able to insert a forefinger between your heel and the rear of your shoe.
(5) You should be able to walk without excessive up and down motion on your foot.
(6) Stand with your foot slanted down—your toes should not touch the end of the boot.
(7) Boot weight generally ranges from 3 to 7 pounds, although many boots made today are less than 3 pounds. More important than weight is a stiff heel counter and toe counter to protect the feet.
(8) Be willing to buy a quality boot—your feet make contact about 2,500 times a mile.
c. Construction—lower boot
(1) Sole construction determines flexibility, comfort, longevity, and future repairs.
(2) Vibram dominates the market for rubber-lug soles and comes in varying hardnesses and several designs. Some hikers leave lug soles at home when hiking fragile terrain or trails.
(3) A midsole (cushion between foot and ground) is a must.
(4) Check the welt (narrow shelf where upper leather meets the sole) for the type and amount of stitching between the sole and upper boot.
(a) Inside stitching (Littleway welt) helps avoid moisture and dirt but is less flexible.
(b) Outer welt construction (Goodyear welt

or Norwegian welt), which is more common, is durable and functional.

d. Construction—upper boot
   (1) Choose a quality leather with a minimum of seams.
      (a) Best leather is top grain, which is made from a layer including the outer surface of the hide. The outside layer is stronger and more water-resistant.
      (b) Leather is "smooth" if boot is made with outside side out.
      (c) Leather is "rough-out" if boot is made with inside side out. Although it looks like suede, rough-out is better quality.
   (2) They may or may not be lined, but need to "breathe."
   (3) For cold temperatures, look for boot with removable insoles.
   (4) The boot should contain a support for the instep, a toughened toe, and a pad (scree collar) around the top.

e. Lacing
   (1) The most common involves eyelets, hooks, rings, or a combination.
      (a) Eyelets seldom pull out, but take time to lace.
      (b) Hooks save time lacing, but tend to break.
      (c) A combination of hooks and rings is convenient.
   (2) Braided nylon laces are strong, durable, and resist weather.
   (3) Recommended lacing is to lace to the top of the boot, then lace back downward two or three rows and tie the knot.
      (a) If toes are cramped, lace lower area loosely, tie knot, lace upper area tight.
      (b) For downhill hiking, lace lower area tight and upper area loose.

f. Breaking in and care
   (1) Break in gradually—wear around house, on short hike, then on longer trip with light pack—allow 4 to 6 weeks break-in period.
   (2) To care for boots, follow manufacturer's recommendations.
   (3) Know how your boots were tanned.
      (a) Most top grain leather boots are tanned with a vegetable or a natural oil.
      (b) Many leathers are also silicone impregnated.
   (4) The general rule is oil on oil-tanned leather and silicone on chrome-tanned leather.

(5) Once dirty, clean boots.
(a) Wash and scrub oil-tanned boots with saddle soap.
(b) When boots are half dry, apply a leather conditioner.
(c) After leather is dry, apply a wax shoe polish.
(d) Apply waterproofing mixture whenever needed.
(e) Wash a silicone impregnated leather boot in water with a pH-balanced treatment.
(f) Let dry, then apply a liquid waterproofing that is at least 15 percent silicone with mineral spirits (give two applications).
(6) Don't forget to wash insides too. Powder or spray with fungicide.
(7) Do not dry wet boots by fire or artificial heat. Let them dry normally. If at home, stuff newspapers inside to absorb moisture.
(8) In camp, do not dry boots by campfire—it will destroy leather.

2. Socks
a. Personal preference will dictate choice.
b. Blisters are caused by moisture and friction.
(1) A thin inner pair of polypropylene, silk, or wool socks and an outer pair of heavier wool socks will help prevent blisters.
(2) If you prefer only one pair, a sock that is a combination of wool and polypropylene, nylon, or cotton will wick moisture away from your feet.
c. To keep feet warm, resilience and sweat absorption of the sock is important.
d. Wool is one of the best choices.
(1) It has greatest resilience, sweat absorption, insulation, and general comfort.
(2) It keeps your feet warm when wet.
(3) It does, however, wear out quickly, doesn't stretch, and shrinks easily.
e. Silk, next to wool, is warmest and makes a good inner sock.
f. Do not cramp feet by wearing too many socks.
g. Carry extra socks and change often.

3. Foot care
a. Be alert to soreness or signs of a blister (warm spot) and treat immediately.
b. Check that socks aren't bunched.
c. Use moleskin if skin is red or tender.
(1) Remove backing.
(2) Cut to size.

(3) Place on spot being rubbed.
(4) Do not place moleskin directly on blister—rather cut a piece to fit around the blister.

d. Remember—the best time to apply moleskin is **before** a blister forms.

4. Shoes
   a. A running shoe with good arch support can be used for light hiking.
   b. Take an extra pair of shoes to wade streams or to change into in camp.

B. Clothing
   1. General
      a. When determining clothing needs, consider weather and length of trip.
      b. Also consider comfort and safety.
      c. Clothing should be durable, light in weight, and do what it is supposed to do.
   2. Cool weather
      a. Layer system provides best insulation.
         (1) Layer 1—Clothing that goes next to skin.
         (2) Layer 2—Clothes that are worn everywhere but to bed (pants, shirt, hat).
         (3) Layer 3—Cold-weather clothes such as windbreaker and trousers, gloves.
         (4) Layer 4—Heavy stuff for below-freezing temperatures such as parkas, insulated pants, knit mask, heavy gloves.
         (5) Rain layer—rain parka or poncho.
      b. As you exercise and become warm, remove a layer of clothing.
   3. Wool
      a. It repels water well.
      b. It keeps you warm even when wet.
      c. It is relatively inexpensive and endures for many years.
   4. Underwear
      a. Ordinary underclothing will usually suffice.
      b. Fishnet, synthetic blends, or insulated underwear may satisfy specific needs.
   5. Pants, shorts
      a. Take both when hiking.
      b. Jeans are heavy and hard to dry when wet.
      c. Be sure to have pockets.
   6. Shirts
      a. Take long-sleeved cotton or wool shirt with button front, high collar, and long shirttail.
      b. Take extra shirt or sweater.
   7. Jackets
      a. Weight may influence choice.
      b. Down-filled jacket is lightweight if you need additional warmth.
   8. Parka

a. Windproof and waterproof parka with attached hood needed for rainy, windy, cold weather.
b. Should have drawstrings for hood and area below the waist, Velcro or snaps for the cuffs, and long zipper with a flap.

9. Rain gear
   a. A poncho can be worn or used as a ground cloth. Rain chaps keep legs dry.
   b. Avoid waterproof garments that are heavy and do not allow moisture to escape when you perspire. In cold weather you can chill quickly if your clothes become wet from perspiration. That can be dangerous if you develop hypothermia (lowering of body temperature).
10. Head gear
   a. Since the head radiates more heat than the rest of the body, a hat will reduce heat loss and keep you warmer in cold weather.
   b. In warm weather, a broad-brim, full-crown hat increases ventilation, reduces sun glare, and protects from the sun. The brim should be soft or pliable so you can wear it with a tall pack. Soak hat in water to keep cool.
11. Hand protection
   a. Mittens are warmer than gloves.
   b. Gloves are handier for some chores.
12. Special clothing and equipment
   a. Needed for winter weather or mountain areas.
   b. Suggested items: insulated underwear, wool clothing, gaiters, overmittens, heavy insulated parka, down pants, down boots, balaclava cap, scarf, bandanna, sunglasses or goggles.
13. Clothing construction
   a. Seams must be strong and well made.
   b. Seams should be finished so edges cannot ravel.
   c. Clothing should be sewn with flat-felled and hem seams.

C. Backpacks
1. Types
   a. Comfort and function must be considered in selection.
   b. Distance and time on the trail determine choice.
   c. For short trips choose a soft pack, rucksack, or knapsack.
      (1) Light, comfortable, practical for a day or two worth of gear.
      (2) Can carry 15 to 20 pounds.
      (3) Can be purchased with or without a frame.
      (4) Shoulder straps and waterproofed material

important considerations in buying.

d. For longer trips, the expedition pack is larger and can be used for heavier loads because of its more rigid frame.

2. Frames—Internal and External
   a. Internal frames
      (1) These are backpacks that look like a large rucksack but which have internal stays that contour to the back. Stays are parallel to the spine or form an "X" across the back.
      (2) Newest designs and materials are being used to make comfortable packs that will custom fit the user, carry a heavy load, and keep all contents inside the bag and protected.
   b. External frames

      The outside pack frame is made of lightweight tubular metal or plastic, contoured to fit the body, and carried high near the body's center of gravity.
   c. With both types of frame, weight is distributed to shoulders, back, and hips. Shoulder and waist straps help absorb shock and transfer weight to hip area.
3. Design and construction
   a. External frames
      (1) Frames are commonly aluminum or an alloy or magnesium, although plastic frames are also available.
      (2) Designs come in "H" and "U" shapes with supportive bands and straps. There should be no less than four crossmembers.
      (3) Metal joints should be welded neatly and clearly. Reject any joints that are cracked.
      (4) On some models frame extends to carry more equipment or to better adjust to the packer.
      (5) Frames can be used to transport other items besides the pack bag.
      (6) Padded shoulder straps should be wide enough to avoid chafing and their length adjustable.
      (7) Back-bands support weight of pack on the back.
      (8) Hip belts should be padded, come in one piece, and have a quick-release buckle. On many of the new packs, hip belts can be raised or lowered on the frame.
   b. Pack bags
      (1) Pack bag should fit frame for which it is intended.
      (2) Better bags are made of tough material like Cordura nylon.

Teaching tip: Demonstrate how to test a frame's strength using a pack. Set it down with the weight on one leg and carefully increase pressure. Does it remain strong or does it give and bend?

(3) Bags are designed with either one or two large compartments and a number of smaller pockets.
(4) Nylon zippers covered with a protective nylon flap are preferable.
(5) Top rain flap should be large enough to cover all contents even when overloaded.
(6) All stitching should be with a durable nylon or cotton-wrapped nylon thread and 8 to 12 stitches per inch. Seams and stress points should be reinforced.
(7) Bags are attached by clevis pins and lock wires.

4. Fit
   a. The frame pack must fit properly.
   b. Most models come in three or four sizes.
   c. Before buying, try on pack with about 30 pounds of books and walk around to see if it is comfortable.
   d. With frame sitting on floor, apply pressure to joints to determine if they are solid.
   e. Check warranty on the backpack.
5. Stuff sacks

   Stuff sacks of different sizes and weights can be used to carry sleeping bags, clothing, or items to be kept separate.

D. Bed gear

Since about a third of trip time constitutes sleeping, selection of bed gear becomes critical.

1. Bedroll
   a. The roll usually consists of a sheet, light wool blanket, heavy wool blanket, and ground cloth.
   b. This is rolled and carried on the pack frame.
2. Bags

   The sleeping bag is constructed to retain body-generated heat in deadened air space.

   a. Design and construction
      (1) Bags come in three different shapes: mummy, barrel or tapered, and rectangular.
         (a) Mummy bag: contoured to the body shape; warmer because less air space to insulate; less maneuverability.
         (b) Barrel bag: contoured to give more space at the middle of the body.
         (c) Rectangular bag: weighs more because has more area to insulate.
      (2) One of the most popular bag fillers is down from geese or ducks.
         (a) It is lightweight, compresses well, expands when released, is durable, and has a wider comfort range than synthetics.

(b) When wet, however, it loses its effectiveness.
(c) It is expensive.

(3) Synthetic fillers are being improved.
(a) They are less expensive than down.
(b) They perform better when wet.
(c) They are bulkier, heavier, and less durable.
(d) They are made of polyester, rayon, or foam and sold under trade names as Hollofil, Quallofil, and PolarGuard.
(e) Avoid cheap polyester filling for it is too heavy and bulky for backpacking.

(4) The warmth of a bag filler is determined by its thickness, or loft. The greater the loft, the greater the amount of dead air space.

(5) Separate compartments, or baffles, are sewn to hold the filler and keep it from shifting and lumping.
(a) Straight sewn-through construction allows for cold spots where outer and inner shells connect.
(b) Laminated construction doesn't leave cold spots but the bag weighs more.
(c) Other methods—box, slant box or slant wall, and V-tube or overlapping—provide maximum insulation with the least weight.
(d) Baffles should be sewn no more than about 6 inches apart with 8 to 10 stitches per inch.
(e) Stitching should be even and straight and double-sewn at stress points such as along the zipper.

(6) Ripstop or taffeta nylon is a good inner and outer cover fabric.

(7) Zippers usually come in three lengths—around the bottom, full-length, and three-quarter length.
(a) Two-way zippers allow for optional ventilation at the foot.
(b) Metal zippers conduct cold and are heavier than nylon zippers.
(c) Both zipper side and other side of bag should contain down-filled baffle or nylon tube to prevent heat loss. Check to see that you can operate zipper from inside without catching the draft tube.

b. Selection
(1) Make sure fit is comfortable. In winter a longer bag is useful to store clothing and equipment inside it.

(2) For winter use, make sure bag has a hood with a draw cord that has a locking device to keep it closed.
(3) When selecting a bag, consider seasonal use, temperature range, body metabolism, frequency of use, weight, warmth, and cost.
(4) Medium-weather bag will usually suffice for spring, summer, and fall.
(a) You should be warm enough with 1½ pounds of down or 1½ to 3 pounds of polyester filling.
(b) Temperature, wind speed, and humidity also affect warmth.
(c) To keep warm, you also can eat, drink warm liquids, sleep inside a shelter, use a pad or ground cloth, put on more clothes, use two sleeping bags or a vapor barrier liner inside one bag.
(d) If too warm, you can remove clothing or unzip your bag.

c. Care
(1) Be careful near a fire so sparks don't burn holes in your bag.
(2) On the trail, keep bag in a stuff sack or wrap a cover around it. Keep it dry!
(3) Air out bag after a trip.
(4) Hang or store flat.
(5) Read manufacturer's directions for cleaning.
(6) Carry a repair kit to immediately repair rips, tears, and burns.

3. Accessories
a. A sleeping pad provides insulation and comfort—closed-cell foam pads such as Ensolite and polyethylene are waterproof. Open-cell pads provide good support but absorb water.
b. An air mattress provides more comfort than protection. It is subject to punctures, needs to be inflated and deflated each day, and is heavier and bulkier than most pads.

E. Shelter

Some type of shelter is recommended for all backpackers.

1. Tents
a. Design
(1) Tents are designed for seasonal use such as spring, summer, and fall; severe winter weather or alpine conditions; and protection against wind, rain, and snow.
(2) Common shapes for tents are dome/semi-dome, A-frame, or tunnel. Some are

staked; some are self-supporting.

(3) An average backpacker should consider buying a three-season, A-frame, two-person tent.

b. Materials

(1) Canvas

(a) Advantages: It repels water, disperses condensation, and is wind resistant and durable.

(b) Disadvantages: It is heavy, mildews, and can tear more easily than other fabrics.

(2) Nylon

(a) It is lighter and stronger than canvas.

(b) To be waterproof, it must be coated with polyurethane or vinyl.

(c) Nylon tents are double walled: the rain fly is waterproofed, while the inner wall is untreated so it can breathe.

c. Construction

(1) High thread count fabrics are more resistant to weather, wind, and abrasions.

(2) The floor should contain few seams, be waterproofed, and extend upward 12 inches on the sides.

(3) Flat fell seams and a variation of lock stitch sewing will add strength.

(4) A good tent withstands wind better if it has a catenary cut—a natural curvature designed when the fabric is cut and sewn. This reduces sag, wind flapping, and stress on seams.

(5) A better tent will be reinforced at points of stress—pole or peg loops and pole sleeves.

(6) Sturdy grommets help prevent fabric from tearing.

(7) Zipper should open from both inside and outside of door and net.

(8) Tent poles should be sturdy, portable, and lightweight.

d. Selection

Define needs: weather, season, weight, material, ventilation, size, pitching and striking ease, and durability.

e. Care

(1) Keep tent away from sparks, flames, and sharp objects.

(2) Wipe up spills and whisk out debris.

(3) Repair rips and punctures with adhesive ripstop nylon tape.

(4) Seal seams with a seam sealer.

(5) Do not store a tent wet. It will mildew.

Dry in the air and sunshine.

(6) When packing, avoid folding on the same lines, which weakens the fabric. Stuffing or loosely rolling in a stuff bag avoids this.

(7) Follow manufacturer's recommendations when washing. Wash as little as possible.

2. Canopies
   a. With a poncho, a few feet of cord, and some stakes, a simple canopy can be constructed to give minimum protection.
   b. A tarp of canvas, nylon, or polyethylene can be used.
   c. A tube tent hung on a ridge line is another inexpensive method of shelter.

F. Essential equipment
   1. Experience, length of trip, season, size of group, and location will influence selection.
   2. Check Appendix 2 for equipment checklist.
   3. Don't forget the first aid kit!

G. Optional equipment

This might include camera, fishing gear, binoculars, pedometer, guidebook, paper, pencil, playing cards, and reading material.

Materials needed:
Several different styles of tents.

(Class Activity)

II. Field Exercise

A. Obtain a tent, preferably two or three tents, and proceed to an outside area. Divide the class into groups. Demonstrate how to put up a tent, then have students practice pitching and striking the tents.

B. You can make the activity more of a challenge.
   1. See which group can set up their tent in the shortest time.
   2. Tell groups they have 10 minutes to set up their tent and get inside or they'll be eaten alive by giant mosquitos.
   3. Blindfold everyone and see which group is quickest to set up the tent.

III. Optional Activities

A. Visit an outfitter's store as a class assignment or a field trip.

B. Invite representatives from the outfitter's store to your classroom and have them bring various items of equipment.

C. Films—some manufacturers have films available to depict certain equipment.

D. Using catalogs, brochures, and pamphlets, compare quality and prices of equipment.

No. 4

Title: Cooking
Refer to the Department of Conservation's *Backpack Cookery* and *Campground Cookery* modules for additional lesson plans.

Method: Lecture, demonstration, field exercise, class discussion

Time: Will depend upon number of lesson plans used

Purpose: To introduce students to the different types of food, stoves, and utensils used by backpackers; to teach methods of food preparation; to determine necessary nutritional value of foods; to teach students basic knowledge and safety about fuel and stoves; to allow each student to participate in actual food preparation

Instructional Aids: Samples of foods such as dehydrated, freeze-dried, and instant, as well as fresh foods; stoves; fuel cylinders; accessories; cooking and eating utensils; menu items

Facilities: Classroom, outdoor area

Outline:

(Lecture)

I. Cooking
   A. Types of food
      1. Backpack food is referred to by a number of different terms.
         a. Lightweight
         b. Recreational
         c. Packaged
         d. Dried
         e. Dehydrated
         f. Instant
         g. Powder dry
         h. Freeze dry
         i. Air dry
      2. The finished product may vary in appearance, flavor, time, and weight.
      3. Outdoor equipment stores, health food stores, and supermarkets handle foods of this nature.
      4. Check dates on packaging for expiration time. Foods in aluminum foil last longer than foods in plastic.
   B. Nutrition
      1. A vigorous packer uses between 4,000 and 5,000 calories per day.
      2. This is divided into approximately 50 percent carbohydrates, 30 percent proteins, and 20 percent fats.

3. Usually 2 to 2½ pounds of lightweight food per person per day meets this requirement.
4. The proteins maintain muscle function, fats supply long-term energy, and carbohydrates supply fast energy.
5. Meals can be simple or complex.
6. Whatever your individual eating habits, the key to keeping up your energy is to replace the calories you burn. Eat high energy foods **before** you tackle a difficult trail.

C. Meal planning and preparation. See *Backpack Cookery* module.

D. Water
1. Without water you can live only a few days.
2. Most backpackers use approximately 4 quarts of liquid a day.
3. Figure 2 pounds per quart of water, or about 8 pounds per gallon.
4. You must keep drinking liquids to avoid becoming dehydrated.
5. Be aware of water sources on the trip and carry a canteen, plastic container, or water bag even on a short hike.

Note to instructor: If possible, have several types of stoves available to demonstrate.

E. Stoves

Plan to carry a stove.

1. Types
   a. Stoves are identified by the fuel they use and how they use it and by their size.
   b. When purchasing, consider prices of stove, price of fuel it burns, availability of that fuel, weight of stove and its fuel, heating efficiency, safety, and convenience.
   c. Convenience includes durability, reliability, starting ease, operating time, and how well it packs.
   d. One-burner stoves are most popular. They weigh 1 to 3 pounds.
2. Fuels
   a. Stoves operate on liquid fuel, such as kerosene or white gas, or cartridges containing butane or propane.
   b. Liquid fuel stoves must convert their liquid to a vaporous gas that expands by heat or pump pressure.
   c. Both kerosene and white gas are common fuels and can be easily purchased.
      (1) White gas burns cleaner, but is more volatile than kerosene.
      (2) Kerosene is safer but slower to start and creates soot.
   d. Cartridge stoves are simple to operate, but there are disadvantages.
      (1) Their fuel is more expensive and less

efficient.
(2) They are hard to operate in cold weather.
(3) Empty cartridges must be carried out.
(4) It is difficult to determine the amount of fuel used in burning.

e. Always check stoves to make sure they are in good working condition before the trip.
f. How much fuel you will need will depend on your stove, the type and amount of food you prepare, weather conditions, and altitude.

3. Maintenance
   a. Follow manufacturer's directions.
   b. Fuel left in the tank and lines may cause a gum build-up that will require taking the stove apart to clean it.
4. Cookware
   a. Use a single aluminum pot that is thick on the bottom and holds 3 to 4 pints.
   b. You can use a second pot that fits inside larger pot.
   c. A lid for the pots can be used as a skillet.
   d. Take along a potholder, handle, or small pair of pliers.
5. Miscellaneous items
   a. Plan to take a metal or plastic cup; a bowl; and a spoon.
   b. Other useful items are knife and fork, plastic bags, tubes, and jars; gloves; pocketknife; plastic salt and pepper shakers; waterproof matches; and fire starter.

(Class demonstration and exercise)

II. Cooking Demonstration
   A. Review safety factors.
   B. Demonstrate use of stove and fuel.
   C. Divide class into small groups.
   D. Have groups practice lighting their stoves.
   E. Each group should prepare a dish or meal.
   F. Sample, share, and enjoy what's been cooked.

III. Optional Activities
   A. Visit several stores to compare the quality and price of backpacking equipment and foods. Check supermarkets for dried foods.
   B. Have students select recipes and plan sample menus.
   C. Ask class members to demonstrate an emergency meal when there is stove failure or adverse weather prevents open fires.

No. 5

Title:	Navigation Refer to the Department of Conservation's *Map and Compass* module as the primary lesson plan source.
Method:	Lecture, film, discussion, demonstration, field exercise
Time:	Will depend upon number of lesson plans used
Purpose:	To acquaint students with types of maps and how to read and use them; to enable students to use a compass; to teach techniques of coordinating map and compass in navigational skills; to discover alternate methods of navigation
Instructional Aids:	See individual lesson plans in *Map and Compass* module
Facilities:	Classroom, outdoor area

Outline:

I. Maps, Topographic Maps, Compasses, Using Map and Compass Together. See *Map and Compass* module.

(Lecture, class discussion)

II. Before the Trip
   A. Gather as much information as possible about your travel area.
      1. Talk to someone who has been to the area.
      2. Obtain written information.
      3. Gather information about landmarks or checkpoints.
   B. Make sure someone knows where you are going.

III. Alternate Methods to Map and Compass
   A. Trail guides
   B. People use signs
   C. Sun and sky

IV. Procedures if Lost
   A. Make sure someone knows where you are and when you plan to return.
   B. Don't travel alone.
   C. If you do travel alone, be well prepared and use well-traveled trails.
   D. If you become disoriented or lost, do not panic.
      1. Mentally trace area you have covered in past 30 minutes.
      2. Sit down, relax, and study the map.
      3. Retrace your steps, if possible, and recheck map and compass points.
      4. If you realize you are really lost, stay in one place.
      5. You can avoid panic with a short rest and something to eat.

6. Try to make contact by blowing a whistle, building a smoky fire, flashing a mirror at an airplane overhead, or yelling if you think you hear someone.

E. If you will have to stay out overnight, select a sheltered site and pitch a tent.
1. Is water supply sufficient?
2. Build a fire and cook some food.
3. Try to get warm and comfortable.
4. Continue signaling.

(Field exercise)

V. Practical field practice in use of map and compass. See *Map and Compass* module.

VI. Optional Activities
See *Map and Compass* module.

No. 6

Title: Campsites

Method: Lecture, class discussion

Time: One 50-minute period

Purpose: To teach students to select and use wisely a site appropriate for their needs; to emphasize the impact camping has on the environment

Instructional Aids: As specified for activities

Facilities: Classroom

Outline:

(Lecture)

I. Campsites
A. Selection
1. Low-impact camping must be a high priority for all backpackers.
2. Selection of a campsite is particularly important—it should be a pleasant site, yet not damage the environment.
3. Certain ecosystems are more resilient and can withstand more use than fragile sites.
a. Examples of resilient sites are heavy forested areas with layers of leaves, prairies, dry grasslands, dry meadows, and rocky outcrops.
b. Fragile sites are glades, sloped areas where erosion can occur, and areas with moss, lichen, or ferns.
4. Always camp at least 100 feet (further if possible) from the trail and any water supply.

5. Follow these guidelines:
   a. **Pristine area—use with caution.**
      (1) Select a resilient site that shows no evidence of use.
      (2) Do not stay more than one night.
      (3) Leave no trace.
   b. **Lightly impacted area—use only if necessary.** These sites deteriorate rapidly with continued use unless they are particularly resilient like a rocky outcrop, dry meadow, or grassland.
   c. **Moderately impacted area—use when possible.** If impact is already evident, camp on well-worn sites.
   d. **Severely impacted area—do not use.** If soil erosion is obvious, tree roots are exposed, and firewood is scarce, steer clear and let scars heal naturally.
6. Avoid damp ground, bogs, and marsh areas. Do not select areas that are meadows, tundra, glades, and grassland if it is wet. Do not disturb vegetation.
7. Choose areas of sand, gravel, rocky soil, or forest undergrowth.
8. Consider the weather and pick a site that is sheltered if necessary.
9. Do not hurry selecting a campsite. Stop 1½ to 2 hours prior to darkness.

B. Setting up
   1. Duties are assigned before stopping for the evening.
   2. Cooking area should comprise two parts:
      a. Stoves or fire area sheltered from the wind.
      b. Food area.
   3. If you must build a fire:
      a. Use an existing fire ring if there is one.
      b. If there is no fire ring, pick a site as free of vegetation as possible.
      c. Dig a shallow pit and build a small fire.
      d. Do not use rocks around the fire.
      e. Use only small pieces of dead, downed wood.
      f. When finished, throw away extra wood, put out the fire, fill in the pit, and camouflage it with pine needles or other natural materials.
   4. Your tent site should provide some privacy, be sheltered, occupy high ground in case it rains, and be level enough for comfortable sleeping.
      a. Clear ground of sharp objects, but otherwise don't disturb the area.
      b. Never trench a tent, never use boughs underneath it, never build rock walls as windbreaks.

C. Sanitation and water supply
   1. Sanitation

a. Locate all latrine areas away from campsite, water supply, or dry stream bed.
b. In a low-use area, a few people can take care of their toilet needs by going at least 100 feet from camp and digging their own hole, then filling it in.
c. In an often-used area, larger groups should go at least 100 feet from camp and dig a hole 4 to 6 inches deep. When finished, fill it in and tamp lightly.
d. Burn, bury, or carry out your paper.
e. Also dig a shallow hole to be used for dishwater, brushing teeth, and other such camp disposal needs. **Do not bury garbage.**

2. Water supply
   a. Do not drink any natural water without proper treatment.
   b. Several methods are recommended to purify water: boiling, chemical tablets, iodine, or bleach.
      (1) Boil water for 20 minutes.
      (2) If you use chemical tablets, be sure they are fresh and begin timing after tablets have dissolved and been mixed.
         (a) If water is cold (less than 41 °F) or cloudy, double the dosage.
         (b) For 1 quart of water, use 5 Halazone tablets or 2 Hydroperiodide tablets and let stand for at least 30 minutes.
      (3) Use 10 drops of 2% tincture of iodine per quart of water and let stand 30 minutes.
      (4) Use 4 drops of bleach per quart of water and let stand 30 minutes.
   c. If you use a filter, make sure it has a pore size of less than two micrometers. Commercially available activated carbon or resin bed-type filters by themselves will not remove harmful organisms.
3. To avoid sanitation problems:
   a. Clean up the cook site after each meal.
   b. Suspend food from a tree to protect it from animals.
   c. Place trash in a bag.

D. Clean-up
1. All gear should be aired and dried before packing.
2. Wash everything away from campsite and water supply. Dispose of dirty water by digging a hole, then relandscaping carefully.
3. Use biodegradable soap.
4. Carry out everything you packed in.
5. Erase any trace of a fire.
6. In sandy areas bring in fresh sand, twigs, and fallen leaves to cover the area.

(Class discussion)

II. Class Discussion
Ask students to define low impact camping and explain its importance.

Note to instructor: To obtain a copy of the film, write: Jim Mentis; Department of Health, P.E., and Recreation; SMSU; Springfield, MO 65804.

III. Optional Activities
- A. Show film "Backpacking in the National Parks" (25 minutes) produced by the Department of Interior. There are a number of films available through the Park Service. To obtain a bulletin, write National Park Service, Midwest Regional Office, 1709 Jackson, Omaha, NE 68102.
- B. Have students draw a map of a selected site area depicting tents, cooking area, latrines, and explain their reasons for the arrangement.
- C. Assign students to research environmental issues within their community and present their findings either verbally or in written reports.

No. 7

Title: Preparation for Backpacking

Method: Lecture, demonstration, class exercise

Time: Two 50-minute periods

Purpose: To teach students basic principles in trip planning; to demonstrate techniques for packing; to present several methods of preparing physically for hiking with a pack; to help students develop their own acclimation program

Instructional Aids: Trip Checklist (Appendix 2), Packing the Pack (Appendix 3), backpack on frame filled with camping gear for demonstration, Individual Conditioning Logbook (Appendix 4)

Facilities: Classroom, gymnasium, or outdoors

Outline:

(Lecture)

I. Introduction
- A. Planning a trip can be rewarding and exciting.
- B. Organized planning is a pre-requisite for a successful trip.

II. Trip Planning
- A. Set a date, with an alternate date as a backup. Determine where you want to go.
- B. Plan for or obtain the following:
  1. Trail location information
  2. Maps
  3. Supplies and equipment (check all equipment)

4. Menus and food
5. Transportation
6. Permits (if needed)
7. Itinerary
8. Weather information
9. Trip roster with pertinent information

C. Take only what is absolutely needed.
1. Water and food
2. Clothing
3. Shelter
4. Sleeping gear
5. Map and compass, matches, flashlight, knife, whistle
6. Stove and cooking gear
7. Personal gear
8. Group gear
9. Special equipment
10. First aid kit
11. Other essentials

D. Personal checklists are a good aid to determine what to take. Most beginning backpackers tend to take too much. Evaluate your list when you return and make notes to help you on the next trip.

Note to instructor: Copy and pass out the Trip Checklist (Appendix 2).

III. Packing Techniques

Note to instructor: Copy and pass out Appendix 3.

A. Package and label food so it can be selected easily.
B. Group clothing by use and weather.
C. Divide gear such as tents, stoves, and water among the group members.
D. Weight will vary depending on weather, length of trip, food, and equipment. Pack should not be more than 20 to 25 percent of your normal body weight.
E. Your heaviest weight should be near the top of the pack and close to your back.
F. Separate horizontal and vertical compartments help balance weight.
G. Least-used items should fill the upper main compartment.
H. Most-used items go in last or in the side pockets.

(Demonstration)

Materials needed:
Backpack, camping gear.

IV. How to Pack for the Trip (Instructor or Guest)
Demonstrate the proper way to pack the backpack, how to distribute the weight, and how to mount and unmount the pack.

A. Medical examination
1. It's a good idea before going on a backpacking trip to have a thorough physical examination. Ask your physician about getting into shape and how you should condition.
2. The exam should focus on possible heart, lung, and blood vessel problems and any foot, leg, hip, or back defects or injuries.

B. Getting in shape

1. The best way to train for walking is by walking—with a load on your back.
2. Train through a gradual program of conditioning for at least six weeks prior to your trip.
3. How you train will depend on age, general body condition, and lifestyle. Follow your doctor's advice.
4. There are two approaches you can take to training.
   a. The "hard-easy principle" advocates walking several fast miles one day with two slow miles the next and resting at least one day on the weekends.
      (1) This can be combined with jogging, running uphill occasionally, and lifting weights.
      (2) As the condition of your body improves, increase the load you carry and walk steeper terrain.
   b. For a more gradual program, start with short walks in the neighborhood, then increase distance and intensity.
      (1) Continue to increase distance and intensity.
      (2) Combine this with swimming, racquetball, and tennis.
5. By training, you increase your cardiovascular fitness and build strength and endurance to heart, lungs, and oxygen-carrying system of the body.
6. Your feet, legs, knees, hips, and backs also should be in good condition.

C. Pacing
1. How you walk is important to using energy most efficiently.
2. Try to establish an easy, consistent rhythm.
3. Avoid abrupt lunges, spurts of speeds, or other moves that interrupt an even pace.
4. Keep your toes pointed straight.
5. Let your arms swing naturally.
6. Practice rhythmic breathing.
7. Take breaks (at least 10 minutes every hour), eat snacks, drink water.
8. Slow down if the trail gets steep and rugged.

V. Mental Conditioning

Note to instructor: If you are planning an extended backpacking trip, a good time to address the students on group standards, behavior, and the need to look out for one another is the first evening. When camp chores are done and everyone is relaxing around a campfire, lead a discussion in which you discuss safety and comfort needs.

A. Looking out for *everyone's* safety and personal comfort is essential on a trip.
B. You should consider the following actions to make the expedition an enjoyable one.
1. Respect your tentmate's privacy and leave personal belongings alone.
2. Keep the camp neat and don't neglect personal hygiene.

3. Try to be conscious of offensive habits or anything you might be doing that annoys others.
4. Cooperate even if things aren't as you had expected.

VI. Individual Planning

Note to instructor: Copy and pass out Appendix 4.

A. Give each student a copy of the "Individual Conditioning Logbook," Appendix 4.
B. Help the class set up a specific program to assure that each class member is physically able to complete any trip you may plan.

VII. Optional Activities

A. Take class outdoors so that each student can experience walking a short distance with a full pack.
B. Divide class into groups and assign each group a trip planning task. Discuss how a backpacking trip is both an individual and a cooperative group effort.
C. Have students practice rhythmic breathing in the classroom by walking around the room. Then take them to stairs if available and have them adjust their pace to their breathing as they walk upstairs.

No. 8

Title: Important Considerations

Method: Lecture, class discussion

Time: One 50-minute period

Purpose: To enable students to recognize potential problems that might occur on the trail; to help students solve or lessen the impact of these problems

Facilities: Classroom

Outline:

(Lecture, class discussion)

I. Important Considerations

A. Weather

1. Weather and weather changes can greatly influence a backpacker's trip, morale, and personal safety.
2. Listen to weather reports and forecasts by the U.S. Weather Service.
3. If you have a severe forecast, consider delaying or postponing your trip.
4. **ASK**: What adjustments would a backpacker need to make to an unseasonably cold weather forecast for the day of the trip?

ANSWERS:

a. Take extra clothing, especially wool, to be layered.
b. Add high energy foods to the menu.
c. Provide shelter and insulation (make sure sleeping bag is adequate).
d. Don't forget hat, gloves.
e. Add items to the equipment list such as matches, candles, fire starter, extra flashlight and batteries, and more fuel.

5. **ASK:** What are some things a backpacker might do to remain cool in extremely warm weather?
ANSWERS:
a. Wear lighter clothing.
b. Take more frequent rest stops.
c. Drink liquids often.
d. Travel in the shade whenever possible.
6. Wet weather is more of a problem when you stop to set up camp and prepare food. Good rain gear should keep you dry.
7. Experienced backpackers develop knowledge about weather to supplement forecasts. They learn to identify clouds.
8. Thunderstorms with heavy rain, lightning, and flash-flooding are common in the hills and mountains. If you are caught in a storm:
a. Avoid open, exposed areas.
b. Move immediately to shelter.
c. Look for a uniform treeline or deep caves for the best protection.
d. Avoid solitary and high trees, shallow caves, and ledges.
e. Disperse the group.

B. Injury, illness, first aid
1. **ASK:** What are some injuries or illnesses a backpacker might suffer and what is the treatment or prevention?
ANSWERS: Examples will vary but might include the following:
a. Person struck by lightning
PREVENTION:
Avoid open and exposed areas; move to shelter; disperse group.
TREATMENT:
(1) Check for breathing and heart stoppage (pulse).
(2) Give rescue breathing if person is not breathing; give cardiopulmonary resuscitation if heart has stopped.
(3) Treat burns.
b. Sunburn
PREVENTION:
Have prior exposure to sun, wear

adequate clothing, and apply sunscreen lotion.
TREATMENT:
(1) Keep area from further sun exposure.
(2) Apply lotion, spray, or salve.
(3) If blisters develop, see a doctor.

c. Dehydration
PREVENTION:
Drink plenty of liquids.
TREATMENT:
(1) Drink liquids.
(2) Get adequate rest.
(3) Eat more salt.

d. Blisters
PREVENTION:
(1) Make sure boots or shoes fit properly and are broken in adequately.
(2) Don't bunch up socks.
(3) Keep socks clean and dry.
TREATMENT:
(1) Apply moleskin or bandages. Peel off back of moleskin and place over area being rubbed. If a blister has formed or skin is broken, do not put moleskin directly on area. Instead, apply it around the blister.
(2) Use lotion and powder.

e. Ankle sprains, knee and back strains
PREVENTION:
(1) Wear proper fitting boots and pack.
(2) Get in condition before the trip.
(3) Don't overdo on the trip.
(4) Avoid jumping or climbing with a heavy pack.
(5) Use an elastic bandage for support.
TREATMENT:
(1) Elevate injured part if possible.
(2) Apply cold moist towels.
(3) Avoid putting weight on sprains.
(4) Reduce the load of the injured person.
(5) See a physician if pain or swelling doesn't subside.

f. Insect sting
PREVENTION:
Proper clothing, repellent, attention for possible danger.
TREATMENT:
(1) Remove stinger if present.
(2) Apply cold compresses.
(3) Watch for any allergic reactions.
(4) Take any medication that has been prescribed if there is an allergic reaction.

g. Poison ivy
PREVENTION:
Know how to identify and avoid contact if possible.
TREATMENT:
Wash in soap and water and apply lotion.

2. You should maintain a pace that allows for enjoyment without overexertion.
3. Load, distance, weather, humidity, and terrain are factors to consider in determining rest stops.
4. Take breaks for a snack, brief rest, and conversation. Check on others in the group.
5. Never travel alone because of the safety factors.

C. First aid

Include the following first aids in your first aid kit:

1. adhesive tape
2. band-aids
3. gauze pads or roll
4. elastic bandage
5. safety pins
6. scissors
7. soap
8. aspirin
9. swabs
10. moleskin
11. eye drops
12. needle
13. antacid tablets
14. personal medicines
15. poison ivy/sunburn spray
16. miscellaneous drugs/doctor prescriptions for individual students on the trip
17. insect repellent
18. antiseptic/antibiotic ointment

D. Wildlife

1. The wilderness is the natural home of animals and plants; we are the intruders.
2. Ticks, bees, mosquitoes, flies, spiders, and scorpions are prevalent in certain areas during certain times of the year.
   a. Use proper precautions to prevent bites and stings.
   b. Use common sense.
   c. Know first aid and carry adequate supplies.
3. There are five venomous snakes in Missouri, but few people are bitten. Most bites occur when persons are trying to kill or handle the snakes. Follow these rules to avoid encounters with venomous snakes:
   a. Avoid, if possible, areas where there may be a concentration of venomous snakes, such as swamps, marshes, and bluffs.

b. Wear protective footwear in areas where there are likely to be snakes. Thick leather or rubber boots or hightop hiking shoes will protect feet, ankles, and lower legs.
c. Never place your hands under rocks or logs; do not step over rocks or logs. Step on them first, then over.
d. Step lively when hiking. Look the ground over, particularly around large rocks or logs when you stop to stand or sit.
e. Avoid any snake you cannot identify.
f. If you are bitten, seek medical attention immediately. For current information on snakebite first aid, contact your nearest American Red Cross office.

4. Do not keep food in your tent or leave it sitting around your campsite. This can attract raccoons, skunks, opossums, and other wild animals. Hang your food from a tree at night, or during the day when you leave the campsite.
5. Mammals may be rabid. Do not pet or encourage them to eat. If bitten, wash immediately with soap and water and see a physician.
6. All backpackers should be immunized for tetanus.

E. Plants
1. Know how to identify poison ivy and poison oak and avoid contact with the plants.
a. Any part of the plant can cause a reaction.
b. You can get a rash from burning wood that has vines attached.
2. Do not eat wild plants unless you are sure what they are and know they are safe.

F. Avoiding emergencies
1. With the proper preparations and training, you should not find yourself in a "survival" situation.
2. Inexperience and poor preparation are the most common factors contributing to emergencies on the trail.
3. Prepare on the following subjects before your trip: safety, first aid, and map and compass.
4. Some factors to consider:
a. Never backpack alone.
b. Leave travel plans with proper individuals.
c. Know your abilities and limitations.
d. Have proper clothing and equipment.
e. Take topographic maps and a compass.
f. Don't panic. Use common sense. Control fear and depression.
5. The most common emergency is getting lost.
a. The best way to avoid getting lost is to be familiar with the area, aware of landmarks,

and have a map and compass with you and know how to use them.
b. In most cases you would be within a few hours walking distance of civilization.
c. Knowledge and practice bolster confidence.
d. Gain the knowledge, practice the skills, and keep your head.

II. Optional Activities
A. Invite a qualified lecturer to discuss first aid and demonstrate emergency first aid techniques.
B. Take class outdoors to identify cloud formations and discuss weather patterns.
C. Look for and identify poison ivy if it is growing near the school.
D. Divide class into small groups and practice first aid situations.

No. 9

Title: Backpacking Areas in Missouri

Method: Lecture, Guest Speaker

Time: One 50-minute period

Purpose: To inform students of areas in Missouri available for backpacking; to help students learn the agencies responsible for these areas

Instructional Aids: Brochures, maps, trail guides

Facilities: Classroom

Outline:

(Lecture)

I. Backpacking Areas in Missouri
A. Wilderness land suitable for backpacking is owned by the state, federal, and local government. Much land is also privately owned.
B. Two books are particularly helpful when planning a trip: *Missouri Hiking Trails* and *Hiking and Backpacking in Missouri.*
C. Information concerning backpacking areas can be obtained from numerous organizations such as the Sierra Club, Audubon Society, Ozark Society, Missouri Trails Association. You can also talk to scout leaders, other backpackers, or sales clerks at local outfitting or outdoor equipment stores. Your district forester or conservation agent is knowledgeable of the area in his or her assigned region.

D. For information on the Ozark Trail, contact the Missouri Department of Natural Resources in Jefferson City.

II. Guest Speakers

Invite one of the following to speak to the class:

A. U.S. Forest Ranger
B. U.S. Park Ranger
C. State Park Interpreter
D. Missouri Department of Conservation Forester

III. Take-Home Exercise

Ask students to write specific agencies to secure information and maps pertaining to certain Missouri trails.

No. 10

Title: Backpacking Trip

Method: Field trip

Time: To be determined by the length of trip

Purpose: To practice lessons taught in an actual field experience

Instructional Aids: Necessary equipment for field trip, Campsite Evaluation Checklist (Appendix 5)

Facilities: Area to backpack

Outline:

I. Select dates and area to backpack.

II. Assign individuals or groups to be responsible for the following before the trip:

A. Maps of the area and compasses
B. Any permits needed
C. Getting tents and checking them
D. Stoves and fuel (check stoves)
E. Food and cooking utensils
F. Water and sanitation needs
G. First-aid supplies
H. Transportation arrangements
I. Miscellaneous

(Field trip)

III. On the trip, designate leaders for:

A. Campsite selection
B. Setting up shelters
C. Cooking
D. Sanitation

E. Clean up
F. Breaking camp
G. Evening campfire programs if desired

IV. Plan an itinerary such as the following:

p.m.	1:30	Depart for trail head
	2:30	Arrive at trail head
	2:45	Unload and check equipment
	3:15	Look at maps, determine direction with compasses, read any trail information
	3:30	Sign registration if there is one and depart
	4:00	Rest stop
	4:10	Continue on trail
	5:00	Arrive at initial campsite select campsite unpack pitch tents address personal hygiene
	5:30	Prepare evening meal
	6:30	Clean dishes/utensils and clear site of any trash and garbage
	7:00	Evening discussion and campfire program
	10:00	Write in diary—sleep
a.m.	6:30	Awaken
	7:00	Prepare breakfast
	8:00	Clean up and pack gear
	8:45	Depart to trail
	9:30	Rest stop
	9:45	Return to trail
	10:30	Rest stop
	10:45	Return to trail
	11:30	Lunch break
p.m.	12:15	Clean up
	12:30	Return to trail
	1:15	Arrive at trail head, rest and refresh
	1:30	Pack and depart
	2:30	Arrive at original point of departure

V. Optional Activities

A. Diaries

Have each student keep a daily diary to record what they see, their impressions of the trip, and anything else that interests them.

B. Campsite Evaluation Checklist

If you want to reinforce how to select a good campsite, pass out the Campsite Evaluation Checklist (Appendix 5) before the trip. Have students fill out the checklist for each campsite you use. Discuss their evaluations during an evening campfire program or as part of the post-trip evaluation.

VI. Post Trip Evaluation

When trip is over, be sure to discuss with students:

A. Was planning adequate?
B. Was everyone prepared?
C. Was the selected trail a good one?
D. Was equipment suitable?
E. Were meals good?
F. Was there enough food? Too much?
G. Was there an adequate supply of water?
H. Were campsites good? (Discuss checklists.)
I. Were campsites left clean and restored?
J. Did the group interact well? Were there any problems?
K. Was distance traveled and pace suitable for everyone?
L. Did they enjoy the trip? Do they want to go again?
M. What could have been done to improve the trip?

No. 11

Title: Review and Evaluation

Method: Lecture, class discussion, written test

Time: One 50-minute period

Purpose: To enable students to review main points of module; to evaluate individual student's progress

Instructional Aids: Appendixes 1 and 6

Facilities: Classroom

Outline:

I. Review
   A. Review by asking questions and answering student questions.
   B. Hand out hidden word puzzle (Appendix 1) for home activity.

II. Examination: Appendix 6 or your own test

Glossary

Baffle	Insulation panels sewn between the inner and outer shells of the sleeping bag to help eliminate cold spots along stitch lines.
Biodegradable	Elements that will break down through the natural processes of the environment.
Cache	A hiding place for storing provisions to keep them away from animals.
Canopy	A covering, such as a tarp, used to protect the packer from the elements.
Conservation	The wise use of our natural resources.
Ecology	The study of the interrelationships of organisms to one another and their environment.
Ethics	Outdoor manners used by backpackers in regard to their fellow packers and the environment.
Fill Power	The volume filled by one ounce of down when it is fully lofted. Most down fills have ratings between 550 and 650.
GORP	A mixture of nuts, chocolate, and dried fruit used as a trail snack; originally stood for "good old raisins and peanuts."
Latrine	A small trench used as a depository for human waste.
Low Impact	Term used to refer to a minimum human effect on the environment.
Moleskin	A type of tape used in first aid situations, especially for blisters.
Mummy Bag	A sleeping bag made so that the bag is contoured to the shape of the body.
Pedometer	Instrument to record distance traveled on foot.
Polypropylene	A fabric of knitted or woven plastic filaments. Moisture is wicked away from the skin so the wearer feels warmer and the fabric dries quickly.
Poncho	A waterproof outer garment that can be worn as a raincoat or used as a ground cloth.
Pristine	Fresh and clean, unspoiled by civilization.
Resilient	Tending to recover from or withstand impact without permanent damage.
Rucksack	A small knapsack worn by hikers for short trips.
Topographic Map	A map that details the contour of the terrain.
Trail Head	A name given to that portion of the trail where the trip originates or ends.
Welt	A strip between the sole and upper part of a boot through which the two are stitched or stapled together.

Bibliography

Acerrano, Anthony J. *The Outdoorsman's Emergency Manual.* New York: Winchester Press, Inc., 1977.

Angier, Bradford. *The Master Backwoodsman.* Harrisburg, PA: Stackpole Books, 1978.

Backpacking in the National Forests: A Family Adventure. Washington, DC: U.S. Government Printing Office, 1974.

Carra, Andrew J., ed. *The Complete Guide to Hiking and Backpacking.* New York: Winchester Press, 1977.

Eggert, Richard. *Backpack Hiking.* Harrisburg, PA: Stackpole Books, 1977.

Elman, Robert. *The Hikers Bible.* Garden City, NY: Doubleday and Company, 1973.

Fear, Daniel, and Fear, Gene. *Surviving the Unexpected, Curriculum Guide.* Tacoma, WA: Survival Education Association, 1974.

Fear, Gene. *Surviving the Unexpected Wilderness Emergency.* Tacoma, WA: Survival Education Association, 1972.

Fletcher, Colin. *The New Complete Walker.* 2nd ed. New York: Alfred A. Knopf, 1974.

Follett, Robert. *What to Take Backpacking—and Why.* Oak Park, IL: Alpine Guild, 1978.

Gass, Ramon D. *Missouri Hiking Trails.* Jefferson City, MO: Missouri Department of Conservation, 1980.

Hart, John. *Walking Softly in the Wilderness.* San Francisco: Sierra Club Books, 1977.

Jack, Nancy. *The Complete Pack Provisioning Book.* Chicago: Contemporary Books, Inc., 1978.

Jaeger, Ellsworth. *Wildwood Wisdom.* New York: The Macmillan Company, 1966.

Jobson, John. *The Complete Book of Practical Camping.* New York: Winchester Press, 1974.

Kelsey, Robert J. *Walking in the Wild.* New York: Funk and Wagnalls, 1973.

Lafser, Fred A. *Hiking and Backpacking in Missouri.* Jefferson City, MO: Fred A. Lafser, Jr., 1974.

Lamoreaux, Marcia, and Lamoreaux, Bob. *Outdoor Gear You Can Make Yourself.* Harrisburg, PA: Stackpole Books, 1976.

Manning, Harvey. *Backpacking: One Step at a Time.* New York: Vintage Books, 1975.

Meir, Joel F. *Backpacking.* Dubuque, IA: William C. Brown Company Publishers, 1980.

Merrill, William K. *The Hikers and Backpackers Handbook.* New York: Winchester Press, 1971.

Meves, Eric. *Guide to Backpacking in the United States.* New York: Macmillan Publishing Company, Inc., 1977.

Mohney, Russ. *The Master Backpacker.* Harrisburg, PA: Stackpole Books, 1976.

Olsen, Larry D. *Outdoor Survival Skills.* Provo, UT: Brigham Young University Press, 1973.
Petzoldt, Paul. *The Wilderness Handbook.* New York: W.W. Norton and Company, Inc., 1974.
Rethmel, R.C. *Backpacking.* 5th ed. Minneapolis: Burgess Publishing Company, 1974.
Risk, Paul H. *Outdoor Safety and Survival.* New York: John Wiley and Sons, 1983.
Schreiber, Lee. *Backpacking.* New York: Stein and Day Publishers, 1978.
Stackpole Books, ed. *Taking Care of Outdoor Gear.* Harrisburg, PA: Stackpole Books, 1983.
VanLear, Denise, ed. *The Best About Backpacking.* San Francisco: Sierra Club Books, 1974.
Waterman, Laura, and Waterman, Guy. *Backwoods Ethics: Environmental Concerns for Hikers and Campers.* Boston: Stone Wall Press, Inc., 1979.
Zakreski, L.A. *The Budget Backpacker.* New York: Winchester Press, 1977.

Appendix 1—Hidden Word Puzzle

Student handout

Find the 28 vocabulary words (listed at bottom of page) that are contained in this puzzle. The words are vertical, horizontal, diagonal, forward, and backward, and some of them overlap.

S T O V E A E D M N D E U S S A P M O C K Z G E
B N H T J F T F S B G B L I R E A N V S A B K C
F D B R R Q H X K E S N E T T I M H F O B G H R
E C A A D G I N C H X J L I J K R L E F L J M D
M B C I C E C N O A F O S R B P B C W S I A E C
F I H L O K S A S X M P R X M F O G U O S H V I
B C N A O D P W M Z M A O O J L K P H R T Z M L
J A K R A P Q A N A E O C K O B T R P D E Q G R
D N C W G V B F C O M P E G S S B O V W R X Y W
I H E K L O L A Z K F N Y O I T F G A B J V C A
E V Y C C H I F T R I A Z S D E S O F T S A C K
J B P U C C S L Q E C N F G T W H W Z J C K L M
N J O X D N K A E I P T G U Q N R E U S T C D V
A K N W M O B S W M I O O C B W E X Y S G Z W L
B C R Y T P A H F K A Q R A B L I T V E C D E F
M U M M Y L G L D M H R H N I O F H J N K N A W
G Y A L N E V I M U N O F I R O P J L R Q U T X
W C G F R S A G A M T U M V O W A E Z E W X H C
S O F B R T D H Y Z A E B D C Y W X B D K A E B
C D A I S D E T K F C P W G N H X I V L J K R L
W L M R L N O G P M Q R N S E H E Z T I Y L U V
V G I B K C W X O E U Z W A T E R A B W C U D L
B F C D C A N T E E N F G J S H I J M K L Q F G

BACKPACKING
BLISTER
CAMFSITE
CANTEEN
COMPASS
CUP
ECOLOGY
ETHICS
GORP
FIRST AID KIT
FLASHLIGHT
FOOD
FRAME
MAP
MITTENS
MUMMY
PARKA
PONCHO
SOCKS
SOFTSACK
STEW
STOVE
TENT
TRAIL
WATER
WEATHER
WILDERNESS
WOOL

Appendix 2—Trip Checklist

Any checklist will vary from person to person, but here are some items you should be sure to take on a backpacking trip.

Essentials

- ☐ Sunglasses
- ☐ Map of the area
- ☐ Compass
- ☐ Flashlight & extra batteries
- ☐ Matches (in waterproof container)
- ☐ First aid kit
- ☐ Fire starter
- ☐ Knife
- ☐ Whistle

Shelter

- ☐ Pack and frame
- ☐ Rain cover
- ☐ Tent or tarp
- ☐ Ground cloth
- ☐ Sleeping bag
- ☐ Pad or air mattress

Kitchen

- ☐ Food and water
- ☐ Cook kit (for cooking and eating)
- ☐ Water bottles
- ☐ Grill
- ☐ Eating utensils
- ☐ Salt and pepper
- ☐ Sugar
- ☐ Can opener
- ☐ Stove, extra fuel
- ☐ Funnel
- ☐ Eyedropper
- ☐ Biodegradable soap
- ☐ Method for purifying water
- ☐ Dishcloth, sponge, or cleaner
- ☐ Garbage bags

Personal

- ☐ Toothbrush
- ☐ Toilet kit
- ☐ Lip salve
- ☐ Mirror
- ☐ Toilet paper
- ☐ Razor
- ☐ Comb or brush
- ☐ Suntan lotion
- ☐ Towel

Footwear

- ☐ Boots
- ☐ Socks
- ☐ Mocassins or tennis shoes
- ☐ Foot powder
- ☐ Moleskin

Clothing (adjust to season)

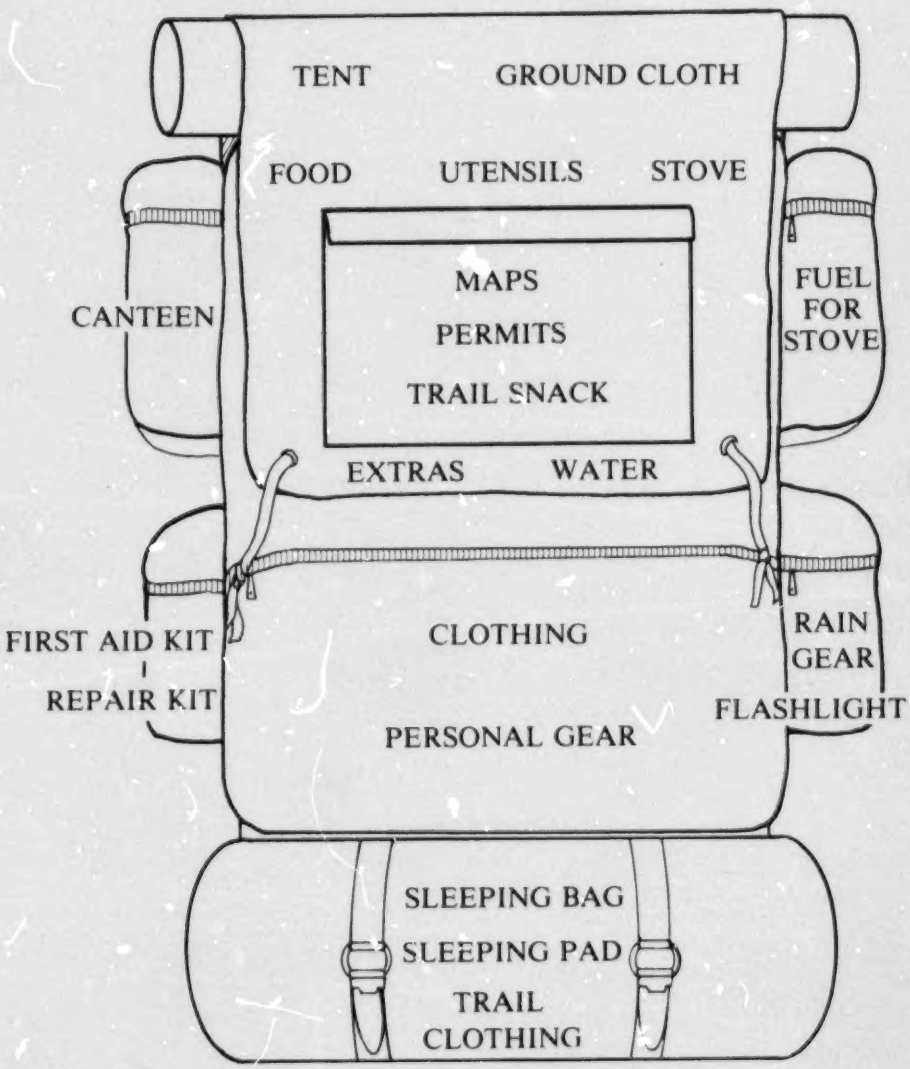
- ☐ Underwear
- ☐ Short pants
- ☐ Long pants
- ☐ Parka
- ☐ Rain gear—poncho
- ☐ Gloves
- ☐ Shirts
- ☐ Hat
- ☐ Scarf—bandanna
- ☐ Belt

Miscellaneous

- ☐ Candle lantern
- ☐ Candles
- ☐ Thermometer
- ☐ Tape
- ☐ Needle and thread
- ☐ Fishing equipment
- ☐ Camera and film
- ☐ Pedometer
- ☐ Goggles
- ☐ Binoculars
- ☐ Cord
- ☐ Notebook or journal
- ☐ Pen or pencil
- ☐ Watch
- ☐ Shovel
- ☐ Ax, saw
- ☐ Reading material

Appendix 3—Packing the Pack

Packs need to be organized so you have access to items you might need on the trail. Develop your own system. Distribute materials according to need and weight. Small items also can be carried in clothing pockets. Avoid hanging items on the outside. With most frames and packs you should carry the weight high and close to the body.



Appendix 4—Individual Conditioning Logbook

Student handout

Keep a daily record of activities and time spent in conditioning prior to a backpacking trip.

DAY	TIME	NUMBER OF BLOCKS	NUMBER OF LAPS	DISTANCE	ALTERNATE METHOD
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

Appendix 5—Campsite Evaluation Checklist

Requirement	Rating		
	Good	Fair	Bad
Water Is it near?			
Fire 1. Can a safe fire be built? 2. Is dead, downed wood available?			
Terrain 1. Is it open with not too much brush? 2. Is it not in a low area subject to high water or rockfalls? 3. Is it level enough for comfort? 4. Is there good drainage?			
Exposure 1. Winter—Is it open to allow sunlight to warm camp? 2. Summer—Is there shade? 3. Is it protected from high winds?			
Safety 1. Are there tent sites not directly under trees? 2. Is it free of insects (away from brush, high grass, and wet places)? 3. Is it free of poisonous plants?			
Environmental Impact 1. Can you camp at least 100 feet from water sources? 2. Can you camp at least 100 feet from the trail? 3. Does area appear to be resilient? Will you be able to have minimum impact? 4. Will you be able to erase any scars you create (fire, latrine)? 5. Are there nests, dens or other wildlife homes you might disturb?			

Appendix 6—Suggested Evaluation

Written exam

1. Write a brief essay describing how people through history have relied on traveling by foot and carrying their necessities for life.
2. List five reasons why people backpack.
3. Describe how to condition for a backpacking trip. Why is it important to do so?
4. Describe how to select a campsite and give five considerations for your selection.
5. How do you get a proper fit in boots?
6. List three methods to keep your feet warm.
7. Why is it best to wear layers of clothes in cold weather?
8. List two advantages of wearing wool.
9. Describe two sleeping bag designs. What are the characteristics of each?
10. List five factors you should consider when you buy a tent.
11. Write a short description of the proper trail procedure for the following:
    a. Disposing of garbage
    b. Building a fire
    c. Digging a latrine
    d. Cleaning up a campsite
12. List five things you can do to avoid an emergency when you are backpacking.
13. This is an area that has not had much use (pristine). Evaluate if you should camp here and what you should do if you do spend the night.
14. This area has been heavily used. Evaluate if you should camp here and give reasons for your decision.
15. Predict some of the problems you might have if you went backpacking with boots and a backpack that didn't fit properly.
16. Write a short paragraph describing how your plans for a backpacking trip would be affected if there were no public lands for backpacking and camping.
17. Make a list of problems created by a lack of outdoor ethics and propose at least one solution for each.

#13—Pristine area

#14—Heavily used area

Practical exam

1. Have your students put up and take down a backpacking tent.
2. Ask students to assemble their gear, pack their backpacks, and demonstrate the best way to put on and take off their packs.
3. Divide students into teams of two. Give each team a backpack stove and a cup of water in a pan. Ask each team to light a stove and bring to a boil the cup of water. Time each group. Watch for proper safety procedures in lighting the stove.

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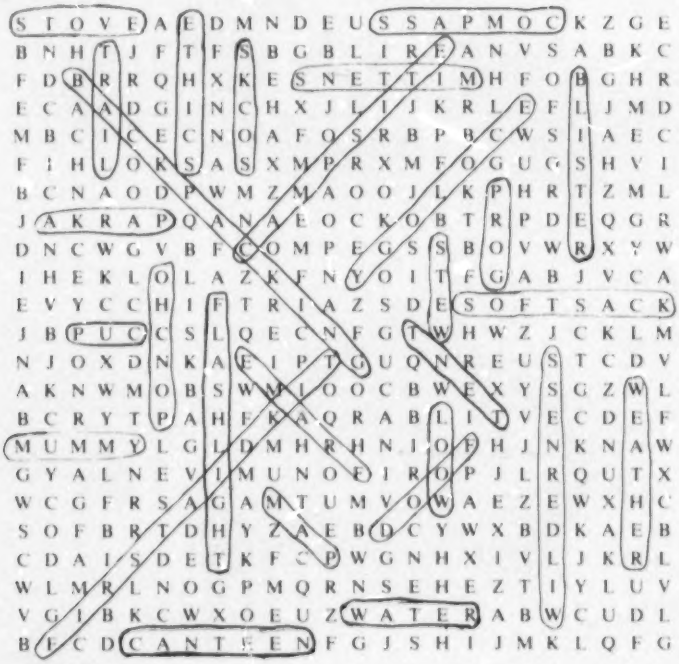
Appendix 7—Instructor's Answer Key

Answers to Hidden Word Puzzle



Answers to Written Exam

1. See pages 13-14.
2. See pages 14-15.
3. See pages 44-46.
4. See pages 39-40.
5. See page 18.
6. (1) Wear two pairs of socks (but don't constrict circulation).
   (2) Change socks often, especially if your feet perspire.
   (3) Put on your hat.
7. Layers provide more insulation and let you take off clothes if you become too warm and begin to sweat.
8. (1) Wool repels water well.
   (2) When it gets wet, wool still keeps you warm.
9. See page 28.
10. See pages 31-32.
11. a. See page 41.
    b. See page 40.
    c. See page 40.
    d. See page 41.
12. See page 51.
13. See page 39.
14. See page 39.
15. Subjective answer to be evaluated by instructor.
16. Subjective answer to be evaluated by instructor.
17. See pages 16-17. Instructor should evaluate answer.

Specialists' Regions

Outdoor Skills Education Specialists and Education Consultants will assist you in obtaining materials and scheduling equipment and films that are available from the Department of Conservation. They also offer workshops to provide training in outdoor skills and conservation education.

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Questionnaire

Please help us evaluate the effectiveness and use of our materials by completing the following questionnaire and mailing it to the Missouri Department of Conservation, Outdoor Skills Education, P.O. Box 180, Jefferson City, MO 65102.

How did you obtain a copy of this module? _____

Have you used this material? Why or Why not? _____

Your position _____

Age group you teach _____

CONTENT AND FORMAT

Were you given enough information to teach this course?

Enough _____ Not Enough _____ Too Much _____

Comments: _____

_____

Was material presented in a manner easy for you to use?

Yes _____ No _____

Comments: _____

_____

What information would you add or subtract? _____

_____

LESSON PLANS AND ACTIVITIES

Did you use the lesson plans?

All of them _____ Some of them _____ None of them _____

Were the time periods allowed for activities adequate?

Adequate ____ Too much time ____ Not enough time____

Comments: _____

_____

What additional activities would you include? _____

Which activities did students most enjoy? _____

What suggestions do you have for future modules? _____

What topics would you like to see covered? _____

Notes

The Missouri Department of Conservation
Outdoor Skills Education
P.O. Box 180
Jefferson City, Mo. 65102